Supplementary Materials

Supplementary Table 1 A summary of each reviewed paper.

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Ayala *et al*[1]	Football	96	18	Hamstring	Decision Tree	Age, History of HSI last season, Maximal level of play achieved, Sleep quality, Physical/emotional exhaustion, Reduced sense of accomplishment, YBalance-Ant-Non Dominant Leg, Ybalance-PostMedial-Non Dominant Leg, YBalance-PostLateral-Non Dominant Leg, YBalance-BilaRatio-Anterior, YBalance-BilaRatio-PostLateral, PTISOM-Hadd-Dominant Leg, PTISOM-Hadd-Norm-Non Dominant Leg, PTISOM-Hadd-Norm-Dominant Leg, BilaRatio-PTISOM-Habd- Dominan Leg, ROM-PHFKE-Dominant Leg, ROM-ADFKE-Non Dominant Leg, ROM-PHA-Dominant Leg, ROM-PHA-Non Dominant Leg, ROM-PHER-Dominant Leg, CORE-USNF, PT-QCON180-Dominant Leg, PT-QCON60-Dominant Leg, PT-QCON240-Non Dominant Leg, PT-QCON180-Dominant Leg, PT-HCON300-Non Dominant Leg, PT-HCON300-Dominant Leg, PT-HCON240-Non Dominant Leg, PT-QECC60-Non Dominant Leg, PT-HECC60-Non Dominant Leg, PT-HECC300-Dominant Leg, PT-HECC180-Non Dominant Leg, APT-HCON-Dominant Leg, APT-HECC180-Dorninant Leg, APT-HECC60-Dominant Leg, APT-HECC60-Non Dominant Leg, APT-QCON240-Non Dominant Leg, APT-QECC30-Non Dominant Leg, APT-QECC60-Dominant Leg, APT-QECC60°/s-Non Dominant Leg, 15-T-QECC60-Dominant Leg, 15-T-QECC30-Non Dominant Leg, 15-T-HECC60-Non Dominant Leg, 15-T-HECC180-Non Dominant Leg, 30-T-QECC180-Non Dominant Leg, 30-T-HECC30-Dominant Leg, 45-T-QECC180- Non Dominant Leg, 45-T-HECC60-	AUC = 0.84

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Dominant Leg, 45-T-HECC180- Dominant Leg, UniRatio H/QCONV300-Non Dominant Leg, UniRatio H/QFUN60-Dominant Leg, 15-UniRatio-H30/Q240-Non Dominant Leg, 15-UniRatio H/QFUN180-Dominant Leg, 15-UniRatio H/QCONv60-Dominant Leg, 15-UniRatio H/QCONV240- Dominant Leg, 15-UnilRatio H/QFUNC180-Non Dominant Leg, 30-UniRatioH/QFUNC60-Dominant Leg, 30-UniRatio-H/QCON180-Dominant Leg, 45-UniRatioH/QFUNC60-Non Dominant Leg, 45-UniRatio-H/QFUNC180-Non Dominant Leg, 45-UniRatio-H/QCONV240-Dominant Leg, 45-UniRatio-H/QCONV300-Non-Dominant Leg, 45-UniRatio H/QCONV300-Dominant Leg, BilaRatio-QCON240, BilaRatio-HCON180, BilaRatio-HCON240 (HSI: hamstring strain injury; Bila: bilateral; ISOM: Isometric; Add: adduction; Abd: abduction; ROM: range of motion; ADF: ankle dorsi-flexion; Q: quadriceps; H: hamstring; HF: hip flexion; HER: hip external rotation; Ant: anterior; Post: posterior; APT: angle of peak torque; ECC: eccentric; CON: concentric; PT: peak torque; T: torque; FUNC: functional; CONV: conventional; USNF: unstable sitting without feedback)	
Bird *et al*[2]	Military	689	160	Lower Body & Torso	Recursive Partitioning and Regression Trees	Gender, BMI, Age, Prior injury history, 3-mile run time, MSKI Health Score (SPARTA Force Plates), Risk Group (SPARTA Force Plates), SPARTA Score (SPARTA Force Plates), Readiness score (DARI Markerless Motion Capture), Quality score (DARI Markerless Motion Capture), Performance Score (DARI Markerless Motion Capture)	AUC = 0.57
Briand *et al*[3]	Speed Skating	11	884	Any Body Part	Random Forest	External training load (Number of laps on ice rink), Internal training load (Perceived fatigue), Psychological wellbeing metrics , Heart rate variability , Neuromuscular function , Injury type and location , Training completion	Sensitivity = 0.35 Specificity = 0.81

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Carey *et al*[4]	Australian Football	75	388	Hamstrings	Logistic Regression	EWMA Distance 3 , EWMA MSR 3 , EWMA HSR 3 , EWMA Player Load 3 , EWMA sRPE 3 , EWMA Distance 6 , EWMA MSR 6 , EWMA HSR 6 , EWMA Player Load 6 , EWMA sRPE 6 , EWMA Distance 21 , EWMA MSR:21 , EWMA HSR 21 , EWMA Player Load 21 , EWMA sRPE 21 , EWMA ACWR Distance 3:21 , EWMA ACWR MSR 3:21 , EWMA ACWR HSR 3:21 , EWMA ACWR Player Load 3:21 , EWMA ACWR sRPE 3:21 , EWMA ACWR Distance 6:21 , EWMA ACWR MSR 6:21 , EWMA ACWR HSR 6:21 , EWMA ACWR Player Load 6:21 , EWMA ACWR sRPE 6:21 , Monotony Distance , Monotony MSR , Monotony Player Load , Monotony sRPE , Strain Distance , Strain MSR , Strain Player Load , Strain sRPE , Mean Distance 3 , Mean MSR 3 , Mean HSR 3 , Mean Player Load 3 , Mean sRPE 3 , Mean Distance 6 , Mean MSR 6 , Mean HSR 6 , Mean Player Load 6 , Mean sRPE 6 , Mean Distance 21 , Mean MSR:21 , Mean HSR 21 , Mean Player Load 21 , Mean sRPE 21 , ACWR Distance 3:21 , ACWR MSR 3:21 , ACWR HSR 3:21 , ACWR Player Load 3:21 , ACWR sRPE 3:21 , ACWR Distance 6:21 , ACWR MSR 6:21 , ACWR HSR 6:21 , ACWR Player Load 6:21 , ACWR sRPE 6:21 , Age	AUC = 0.76
Castellanos *et al*[5]	Multiple Disciplines	15,682	595	Concussion	SVM	Expected Depth Chart Position, Primary Collegiate Sport, Cross Country/Track Position, Number of Concussions, History of Concussion, Primary Collegiate Sport, Current Collegiate GPA (Ratio), Current Collegiate GPA (Ratio), Expected Starting Status, Football Helmet Detail, Wears a Mough Guard, Primary Collegiate Sport, High-School GPA (Ratio), Current Academic Year, Handedness, Primary Collegiate Sport, Age, BESS: Total Score, BESS: Foam Score, ADD/ADHD, Race, Estimated Family Income of Parent(s)/Guardian(s), Secondary Sport History, ImPACT: Verbal Memory Composite Score, Height, SCAT 3 Symptom Severity Score, BMI, History of Skipping a School	AUC = 0.73

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Year/Grade, Migraine Headaches, Primary Collegiate Sport, Average Hours of Sleep Each Night (Weeknight), Secondary Sport History, Age, SAC: Total Score, Prescription Birth Control Medication, Secondary Sport History, Alcohol Use in the Past Month, Marijuana Use in the Past Month, Sex, Weight, Wears Protective Equipment, Learning Disorder, Secondary Sport History, BESS: Firm Score, Wears a Mough Guard, SCAT 3 Symptom Number, Secondary Sport History, History of School-Mandated Academic Assistance, Secondary Sport History, ImPACT: Reaction Time Composite Score, Brief Sensation Seeking Scale Score, BMI, Father/Guardian 2 Occupation, Secondary Sport History, CARE Consortium Site, CARE Consortium Site, Depression, CARE Consortium Site, BESS: Total Score, ACT: Math Section Score, Satisfaction With Life Scale Score, Secondary Sport History, Wears a Helmet, Baseball Position, ACT: Total Score, Primary Collegiate Sport, CARE Consortium Site, CARE Consortium Site, Secondary Sport History, Rowing/Crew Position, ImPACT: Visual Memory Composite Score, BSI: Somatization Score, Secondary Sport History, Secondary Sport History, Father/Guardian 2 Highest Completed Education, ACT: Reading Section Score, SAT: Total Score (Ratio), Current Academic Year, Lacrosse Helmet Detail, ACT: Total Score, HADS: Anxiety Score, History of Repeating a School Year/Grade, Secondary Sport History, Prescription Asthma Medication, History of Other Academic Assistance, SAT: Total Score (Ratio), ACT: Math Section Score, ImPACT: Visual Memory Composite Score, Mean Clinical Reaction Time, CogState/Axon: Attention Score, CogState/Axon: Processing Speed Score, CogState/Axon: Working Memory Accuracy Score, CogState/Axon: Working Memory Speed Score, Expected Starting Status,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Prescription Psychostimulant Medication, ACT: Science Section Score, Secondary Sport History, Vision Problems, Wears Wrestling Headgear, History of Concussion, CARE Consortium Site, Average Hours of Sleep Each Night (Weeknight), Primary Collegiate Sport, Ethnicity, CogState/Axon: Learning Score, Mother/Guardian 1 Highest Completed Education, Wears Protective Equipment, SAC: Total Score, Mother/Guardian 1 Occupation, Current Collegiate GPA (Ratio), Prescription Allergy Medication, Migraine Headaches: Any Relative, Headache Disorder (Non-Migraine): Parent, Secondary Sport History, ACT: Total Score, CNS-VS: Verbal Memory Standard Score, Meningitis, Estimated Family Income of Parent(s)/Guardian(s), Short-Form 12: Mental Health Score, Short-Form 12: Physical Health Score, Father/Guardian 2 Occupation, Father/Guardian 2 Occupation, ACT: Writing Section Score, Mother/Guardian 1 Occupation, Height, Rowing/Crew Position, Headache Disorder (Non-Migraine): Any Relative, Primary Collegiate Sport, High-School GPA (Ratio), Prescription Antidepressant Medication, Prescription Non-Narcotic Pain Medication, ACT: Reading Section Score, SCAT 3 Symptom Number, CNS-VS: Visual Memory Standard Score, BESS: Firm Score, Estimated Family Income of Parent(s)/Guardian(s), History of Moderate-Severe Brain Injury, CNS-VS: Composite Memory Standard Score, ACT: Science Section Score, Secondary Sport History, SCAT 3 Symptom Severity Score, ANAM: Procedural Reaction Time Score, CNS-VS: Reaction Time Standard Score, Secondary Sport History, Estimated Family Income of Parent(s)/Guardian(s), ImPACT: Verbal Memory Composite Score, BSI: Anxiety Score, Current Academic Year, CNS-VS: Visual Memory Standard Score, Secondary Sport	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						History, Prescription Acid Reflux/Heartburn Medication, Mother/Guardian 1 Highest Completed Education, Migraine Headaches: Sibling, Secondary Sport History, King Devick Baseline Score, Age at Time of First Concussion, Secondary Sport History, Schizophrenia, CNS-VS: Neurocognition Index Standard Score, Satisfaction With Life Scale Score, VOMS: Horizontal VOR (Symptoms), Age at Time of Most Recent Concussion, Father/Guardian 2 Highest Completed Education, ACT: English Section Score, ANAM: Code Substitution Score, King Devick Baseline Score, ANAM: Matching to Sample Score, Balance Disorder, CogState/Axon: Working Memory Speed Score, ImPACT: Visual Motor Speed Composite Score, ImPACT: Visual Memory Composite Score, Secondary Sport History, ImPACT: Verbal Memory Composite Score, CNS-VS: Cognitive Flexibility Standard Score, Symptomatic Days (Maximum Duration), CNS-VS: Reaction Time Standard Score, ImPACT: Reaction Time Composite Score, Rowing/Crew Position, History of 504 Plan, CARE Consortium Site, Secondary Sport History, Diabetes, Autism Spectrum Disorder, Brief Sensation Seeking Scale Score, Baseball Position, Over-the-Counter Advil/Ibuprofen, Cross Country/Track Position, CNS-VS: Verbal Memory Standard Score, Secondary Sport History, Mean Clinical Reaction Time, Softball Position, Secondary Sport History, CNS-VS: Composite Memory Standard Score, Race, History of Individualized Education Plan (IEP), ANAM: Simple Reaction Time 2 Score, Mother/Guardian 1 Occupation, Migraine Headaches: Parent, ImPACT: Visual Motor Speed Composite Score, ANAM: Code Substitution Score, Brief Sensation Seeking Scale Score, SCAT 3 Symptom Number, SCAT 3 Symptom Severity Score, Cross Country/Track	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Position, ANAM: Code Substitution Score (Delayed), Over-the-Counter Claritin/Allergy Medication, Current Academic Year, CNS-VS: Complex Attention Standard Score, ANAM: Simple Reaction Time 2 Score, CNS-VS: Complex Attention Standard Score, ANAM: Code Substitution Score (Delayed), Ethnicity, Secondary Sport History, VOMS: Near Point Convergence (Symptoms), CARE Consortium Site, Mother/Guardian 1 Highest Completed Education, CNS-VS: Processing Speed Standard Score, Over-the-Counter Tylenol/Acetaminophen, CNS-VS: Processing Speed Standard Score, ACT: Science Section Score, CNS-VS: Complex Attention Standard Score, ANAM: Simple Reaction Time Score, Primary Collegiate Sport, Estimated Family Income of Parent(s)/Guardian(s), Weight, CNS-VS: Executive Function Standard Score, CogState/Axon: Working Memory Accuracy Score, CNS-VS: Motor Speed Standard Score, Father/Guardian 2 Highest Completed Education, Brain Surgery, CNS-VS: Motor Speed Standard Score, ACT: Math Section Score, HADS: Depression Score, Loss of Consciousness (Minimum Duration), Father/Guardian 2 Occupation, VOMS: Near Point Convergence (Distance), CNS-VS: Verbal Memory Standard Score, Seizure Disorder, High-School GPA (Ratio), CNS-VS: Neurocognition Index Standard Score, ANAM: Matching to Sample Score, Hearing Problems, Father/Guardian 2 Occupation, Bipolar Disorder, American Football Position, Stroke, CNS-VS: Executive Function Standard Score, Estimated Family Income of Parent(s)/Guardian(s), Estimated Family Income of Parent(s)/Guardian(s), Height, CNS-VS: Cognitive Flexibility Standard Score, Post-Traumatic Amnesia (Minimum Duration), History of Other Academic Assistance, Age at Time of Most Recent Concussion, CNS-VS: Psychomotor	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Speed Standard Score, Cross Country/Track Position, SAC: Total Score, BSI: Global Severity Index, ANAM: Mathematical Processing Score, ANAM: Simple Reaction Time Score, ANAM: Mathematical Processing Score, ANAM: Mathematical Processing Score, Memory Disorder, Tobacco Use in the Past Month, Rowing/Crew Position, Mother/Guardian 1 Occupation, ANAM: Mathematical Processing Score, American Football Position, CNS-VS: Psychomotor Speed Standard Score, ImPACT: Verbal Memory Composite Score, Alcohol Use in the Past Month, Weight, ANAM: Procedural Reaction Time Score, Race, Migraine Headaches: Grandparent, CNS-VS: Processing Speed Standard Score, Tennis Position, Mean Clinical Reaction Time, ANAM: Mathematical Processing Score, ACT: English Section Score, Headache Disorder (Non-Migraine): Sibling, SAT: Total Score (Ratio), American Football Position, American Football Position, Marijuana Use in the Past Month, CogState/Axon: Working Memory Speed Score, BESS: Foam Score, ANAM: Matching to Sample Score, ANAM: Simple Reaction Time Score, Primary Collegiate Sport, Race, ANAM: Code Substitution Score, Average Hours of Sleep Each Night (Weekend), CogState/Axon: Processing Speed Score, Cross Country/Track Position, Post-Traumatic Amnesia (Maximum Duration), CNS-VS: Visual Memory Standard Score, CogState/Axon: Learning Score, Average Hours of Sleep Each Night (Weekend), History of 504 Plan, Wears Protective Equipment, CNS-VS: Executive Function Standard Score, ACT: Total Score, Tennis Position, ACT: Math Section Score, CNS-VS: Psychomotor Speed Standard Score, CogState/Axon: Attention Score, ANAM: Procedural Reaction Time Score, ACT: English Section Score, Tennis Position, Sprint Football Position, Prescription Anti-Anxiety	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Medication, Weight, ImPACT: Visual Motor Speed Composite Score, Primary Collegiate Sport, Baseball Position, Balance Disorder, VOMS: Vertical Saccades (Symptoms), Mother/Guardian 1 Highest Completed Education, Satisfaction With Life Scale Score, Alcohol Use in the Past Month, Parkinson's Disease: Parent, ACT: Writing Section Score, American Football Position, Tennis Position, Ice Hockey Position, American Football Position, Tobacco Use in the Past Month, Sprint Football Position, Primary Collegiate Sport, Memory Disorder: Grandparent, Age at Time of First Concussion, Age at Time of Most Recent Concussion, SOT: Composite Balance Score, Secondary Sport History, Wrestling Position, Loss of Consciousness (Maximum Duration), Cross Country/Track Position, CARE Consortium Site, CogState/Axon: Attention Score, CNS-VS: Processing Speed Standard Score, CNS-VS: Cognitive Flexibility Standard Score, SOT: Somatosensory Ratio Score, Wrestling Position, Race, Rowing/Crew Position, History of Repeating a School Year/Grade, Headache Disorder (Non-Migraine): Grandparent, SOT: Composite Balance Score, CNS-VS: Motor Speed Standard Score, ACT: Reading Section Score, Parkinson's Disease: Grandparent, Hockey Helmet Detail, High-School GPA (Ratio), CNS-VS: Neurocognition Index Standard Score, SOT: Visual Ratio Score, Wears a Helmet, Prescription Antipsychotic Medication, Current Academic Year, SOT: Composite Balance Score, Short-Form 12: Mental Health Score, Short-Form 12: Physical Health Score, CNS-VS: Executive Function Standard Score, Softball Position, Father/Guardian 2 Highest Completed Education, SOT: Somatosensory Ratio Score, Secondary Sport History, SOT: Vestibular Ratio Score, VOMS: Visual Motion Sensitivity (Symptoms), Lacrosse Position,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						CNS-VS: Complex Attention Standard Score, Wrestling Position, Headache Disorder (Non-Migraine), Prescription Narcotic Pain Medication, Mean Clinical Reaction Time, ImPACT: Reaction Time Composite Score, Memory Disorder, SOT: Vestibular Ratio Score, Field Hockey Position, SOT: Visual Ratio Score, VOMS: Horizontal Saccades (Symptoms), Primary Collegiate Sport, Lacrosse Position, Number of Concussions, SOT: Visual Ratio Score, Baseball Position, SOT: Vestibular Ratio Score, CNS-VS: Neurocognition Index Standard Score, Illicit Drug Use in the Past Month, Basketball Position, SOT: Somatosensory Ratio Score, BMI, Memory Disorder: Parent, VOMS: Smooth Pursuit (Symptoms), CNS-VS: Cognitive Flexibility Standard Score, Hockey Helmet Detail, VOMS: Near Point Convergence (Symptoms), VOMS: Horizontal Saccades (Symptoms), VOMS: Vertical Saccades (Symptoms), VOMS: Smooth Pursuit (Symptoms), VOMS: Horizontal VOR (Symptoms), VOMS: Vertical VOR (Symptoms), CNS-VS: Executive Function Standard Score, CNS-VS: Composite Memory Standard Score, Average Hours of Sleep Each Night (Weekend), Volleyball Position, Satisfaction With Life Scale Score, VOMS: Visual Motion Sensitivity (Symptoms), Secondary Sport History, CogState/Axon: Learning Score, Other Prescription Medication, Satisfaction With Life Scale Score, Football Helmet Detail, BSI: Depression Score, ACT: English Section Score, Memory Disorder: Sibling, Primary Collegiate Sport, Handedness, BESS: Firm Score, Field Hockey Position, Soccer Position, CogState/Axon: Attention Score, Basketball Position, Hockey Helmet Detail, ANAM: Code Substitution Score (Delayed), Height, Sex, CNS-VS: Psychomotor Speed Standard Score, VOMS: Vertical VOR (Symptoms), American Football Position, Softball	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Position, Sprint Football Position, Mother/Guardian 1 Highest Completed Education, Volleyball Position, Football Helmet Detail, Prescription Birth Control Medication, Short-Form 12: Mental Health Score, ACT: Reading Section Score, Hockey Helmet Detail, Water Polo Position, Loss of Consciousness (Minimum Duration), Ice Hockey Position, Baseball Position, BSI: Depression Score, Primary Collegiate Sport, Soccer Position, Current Academic Year, ANAM: Procedural Reaction Time Score, Hockey Helmet Detail, Number of Concussions, ANAM: Simple Reaction Time 2 Score, Collegiate GPA Not-Applicable (New Freshman), Sprint Football Position, Memory Disorder: Any Relative, ImPACT: Visual Motor Speed Composite Score, Tobacco Use in the Past Month, CNS-VS: Motor Speed Standard Score, Primary Collegiate Sport, Lacrosse Position, Hearing Problems, Illicit Drug Use in the Past Month, Parkinson's Disease: Sibling, Mother/Guardian 1 Occupation, Ethnicity, Wears Wrestling Headgear, Hockey Helmet Detail, Football Helmet Detail, Prescription Sleep Aid/Sedative Medication, Hockey Helmet Detail, Lacrosse Helmet Detail, Hockey Helmet Detail, Ice Hockey Position, Wears a Mough Guard, Sprint Football Position, King Devick Baseline Score, CNS-VS: Reaction Time Standard Score, Field Hockey Position, Sprint Football Position, Sprint Football Position, Sprint Football Position, Sprint Football Position, Field Hockey Position, CNS-VS: Psychomotor Speed Standard Score, HADS: Depression Score, Wrestling Position, Cross Country/Track Position, Wrestling Position, Parkinson's Disease: Any Relative, Headache Disorder (Non-Migraine), BSI: Global Severity Index, CNS-VS: Cognitive Flexibility Standard Score, Ice Hockey Position, Ice Hockey Position,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Short-Form 12: Physical Health Score, Secondary Sport History, Father/Guardian 2 Occupation, Father/Guardian 2 Highest Completed Education	
Connaboy *et al*[6]	Military	140	38	Lower Extremity	Decision Tree	Age, Height, Weight, Body fat, Aerobic capacity, Peak anaerobic power, Mean anaerobic power, R knee extension, R knee flexion, L knee extension, L knee flexion, R knee flexion/extension ratio, L knee flexion/extension ratio, R ankle eversion, L ankle eversion, R ankle inversion, L ankle inversion, R ankle eversion:inversion ratio, L ankle eversion/inversion ratio, Knee extension, Knee flexion, Ankle eversion, Ankle inversion, R hip extension, L hip extension, R knee active extension, L knee active extension, R ankle dorsiflexion, L ankle dorsiflexion, Hip extension, Knee active extension, Ankle dorsiflexion	AUC = 0.91
Farhadian *et al*[7]	Multiple Disciplines	356	55	Mouth	Random Forest	Age (year) , Gender, Father's education , Mother's education, Child's Birth Order, Sport, Experience [years] , Training days per week , Training hour per day, Mouth guard Awareness, Mouth guard Use	Accuracy = 0.89
Goggins *et al*[8]	Cricket	17	50	Any Body Part	Random Forest	Balls bowled, sRPE, Height, Weight, Body mass, Sum of 8 skinfolds, Total shoulder range of motion , Combined elevation , Dorsiflexion lunge test , Straight leg raise test , Total hip range of motion , Grip strength , Total thoracic spine rotation , Rotator cuff Strength , Single leg hop & hold , Broad jump , Sumo Deadlift - 5 rep maximum , Hip thrust - 5 rep maximum , Triple hop test , 10m, 20m, 30, 40m speed , Run Two , 505 agility test , Yo-Yo	AUC = 0.72
Hecksteden *et al*[9]	Football	88	51	Any Body Part	Gradient Boosting Algorithm (GBM)	Age, Playing position, Injury history, Endurance capacity, Sprinting speed, Body composition, SIMS Score, SIMS Pain, Training load, Subjective recovery, Training/Match, Stress imposed (team average sRPE), Period following return-to-play	AUC = 0.62
Henriquez *et al*[10]	Multiple Disciplines	122	53	Lower Extremity	Random Forest	Hip adductor strength, Hip external rotation strength, Straight leg raise, Height, Hip abductor strength, Hip internal rotation strength, Eyes open	AUC = 0.69

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						balance test composite score Ankle dorsiflexion strength, Ankle plantarflexion strength, Primary sport type, Knee flexion strength, Eyes closed balance test composite score Active knee extension, Ankle eversion strength, Ankle inversion strength	
Hsu *et al*[11]	Long Distance Runners	22	10	Kidneys	SVM	Age, Gender, Body Height, Body Mass, Body Mass Index, AKI Stage 0, AKI Stage 1, BUN (mmol/L), Creatinine (mg/dL), GFR (mL/min), Na (mmol/L), K (mmol/L), CK (U/L), CKMB (U/L), TROP T (ug/L), MYO (ng/dL), HDL (mg/dL), TG (mg/dL), LDL (mg/dL), CHOL (mg/dL), BMR (kcal), FFMKG (kg), FFM (%), FATKG (kg), FAT (%), TBW (L), TBW100 (%), ECW (L), ECW100 (%), ICW (L), ICW100 (%), ECWICW, BCM (kg), ECM (kg), CCR (mL/min), PROTEIN (kg), MINERAL (kg), MUSCLE (kg), TBK (g), TBCa (g), GLYCOGEN (g), DRY WEIGHT (kg), ECS (L), ECF (L), PF (L), InterstF (L), Body Volume (L), Body Density (kg) (Nitrogen (BUN, mmol/L), creatinine (mg/dL), sodium (Na, mmol/L), potassium (K, mmol/L), glomerular filtration rate (GFR, mL/min), high-density lipoproteins (HDLs, mg/dL), triglyceride (TG, mg/dL), low-density lipoproteins (LDLs, mg/dL), cholesterol (CHOL, mg/dL), CK (U/L), CK-MB (U/L), MYO (ng/dL), troponin (TROP T, µg/L), basal metabolic rate (BMR) (kcal), fat-free mass (FFMKG, kg), the fatfree mass ratio (FFM, %), fat (FATKG, kg), the fat ratio (FAT, %), total body water volume (TBW, L), the total body water volume ratio (TBW100, %), extracellular water volume (ECW, L), the extracellular water volume ratio (ECW100) (%), intracellular water volume (ICW) (L), the intracellular water volume ratio (ICW100, %), the ECW to ICW ratio (ECWICW), body cell mass (BCM, kg), extracellular mass (ECM, kg), creatinine clearance (CCR, mL/min), GFR (mL/min), protein mass (kg), mineral mass (kg),	Sensitivity = 0.90 Specificity = 1

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						muscle mass (kg), total body K (TBK, g), total body calcium mass (TBCa, g), glycogen mass (g), dry weight (kg), extracellular solids (ECS, L), extracellular fluid (ECF, L), plasma fluid (PF, L), interstitial fluid extra vascular (InterstF, L), body volume (L), and body density mass (kg))	
Huang *et al*[12]	Basketball	16	27	Lower Extremity	XGBoost	sRPE (AU), Menses (AU), Fatigue (AU), Sleep Quality (AU), Muscle Soreness (AU), Stress Levels (AU), Desire (AU), Urine Protein (AU), Urobilinogen (AU), Urine pH (AU), Urine Specific Gravity (AU), Urine Blood (AU), Urine Ketones (AU), Squat 1RM (kg), 15 m × 17 Shuttle Run (s), 5.8 m × 6 Shuttle Run (s), Maximum Vertical Jump (cm), Injury Severity (AU)	Precision = 0.93, Sensitivity = 0.92
Jauhiainen *et al*[13]	Basketball & Floorball	314	57	Knee & Ankle	Logistic Regression	Height (cm), Weight (kg), BMI (kg/m2), Anteversion dominant (deg), Anteversion non-dominant (deg), Knee valgus IC dominant (deg), Knee valgus IC non-dominant (deg), Knee valgus peak dominant (deg), Knee valgus peak non-dominant (deg), Knee flexion IC dominant (deg), Knee flexion IC non-dominant (deg), Knee flexion peak dominant (deg), Knee flexion peak non-dominant (deg), Vertical ground reaction force dominant (N), Vertical ground reaction force non-dominant (N), Knee abduction moment peak dominant (N · m), Knee abduct moment peak non-dominant (N · m), Medial knee displacement dominant (mm), Medial knee displacement non-dominant (mm), Hip flexion peak dominant (deg), Hip flexion peak non-dominant (deg), Ankle dorsiflexion dominant (deg), Ankle dorsiflexion non-dominant (deg), Ankle flexion IC dominant (deg), Ankle flexion IC non-dominant (deg), Hip flexion IC dominant (deg), Hip flexion IC non-dominant (deg), Knee flexion moment peak dominant (N · m), Knee flexion moment peak non-dominant (N · m), Hip flexion moment dominant (N · m), Hip flexion moment non-dominant (N · m),	AUC = 0.65

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Hamstring flexion dominant (deg), Hamstring flexion non-dominant (deg), Hip strength dominant (kg), Hip strength non-dominant (kg), Isokinetic extension dominant (kg), Isokinetic extension non-dominant (kg), Isokinetic flexion dominant (kg), Isokinetic flexion non-dominant (kg), Leg press one repetition maximum (kg), Navicular drop dominant (mm), Navicular drop non-dominant (mm), Exposure (h), Age (yr), Genu recurvatum dominant (deg), Genu recurvatum non-dominant (deg), KT1000 dominant (mm), KT1000 non dominant (mm), Generalized joint laxity (points), Dominant knee previous injuries, Non-dominant knee previous injuries, Dominant ankle previous injuries, Non-dominant ankle previous injuries, Sex (male-female)	
Jauhiainen *et al*[14]	Soccer and Handball	791	60	Knee	SVM	Age tested, Bodymass, Height, Age started elite play, Number of seasons elite play, Match hours avg week, Previous acl, Family acl history, Current acl prevention, Legpress max, Kt1000 predef pull mm, Kt1000 manual pull mm, Ham mobility degrees , Genu recurvatum degrees , Hip anteversion degrees , Knee valgus static , Pelvis forward tilt static, Pelvis l tilt static, Pelvis l rot static, Pelvis width, Femur length , Tibia length , Femur condyle width , Tibia condyle width , Leg length , Quad best, Ham best, H q relation, Singleleg squat hip , Singleleg squat knee , Singleleg dropjump hip, Singleleg dropjump knee, Dropjump bilateral, Anterolateral cm , Mediolateral cm , Posterolateral cm , Hip abduction kg , Naviculardrop, Gl index, Jump hip flex ic , Jump hip flex max , Jump hip abd ic , Jump hip abd max , Jump hip rot ic , Jump knee flex ic , Jump knee flex max , Jump knee valgus ic , Jump knee valgus max , Jump knee rot ic , Jump ankle plflex ic , Jump ankle plflex max , Jump ankle inv ic , Jump ankle inv max , Jump ankle rot ic , Jump hip	AUC = 0.63

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						mom flex max , Jump hip mom flex max100 , Jump hip mom abd max , Jump hip mom abd max100 , Jump knee mom flex max , Jump knee mom flex max100 , Jump knee mom abd max , Jump knee mom abd max100 , Jump ankle mom dflex max , Jump ankle mom dflex max100 , Jump ankle mom inv max , Jump ankle mom inv max100 , Jump grf vert max , Jump grf vert time max , Jump grf med max , Jump grf med time max , Jump grf post max , Jump grf post time max , Jump hip flex time max , Jump knee flex time max , Jump knee valgus time max , Jump ankle plflex time max , Jump hip mom flex time max , Jump hip mom abd time max , Jump knee mom flex time max , Jump knee mom abd time max , Jump impulse , Jump fppa ic , Jump fppa max , Jump com height ic, Jump com height min, Jump com height time min, Jump com vertical speed ic, Jump torso flex ic, Jump height, Cut hip flex ic , Cut hip flex max , Cut hip abd ic , Cut hip abd max , Cut hip rot ic , Cut knee flex ic , Cut knee flex max , Cut knee valgus ic , Cut knee valgus max , Cut knee rot ic , Cut ankle plflex ic , Cut ankle plflex max , Cut ankle inv ic , Cut ankle inv max , Cut ankle rot ic , Cut hip mom flex max , Cut hip mom flex max100 , Cut hip mom abd max , Cut hip mom abd max100 , Cut knee mom flex max , Cut knee mom flex max100 , Cut knee mom abd max , Cut knee mom abd max100 , Cut ankle mom dflex max , Cut ankle mom dflex max100 , Cut ankle mom inv max , Cut ankle mom inv max100 , Cut grf vert max , Cut grf vert time max , Cut grf med max , Cut grf med time max , Cut grf post max , Cut grf post time max , Cut hip flex time max , Cut knee flex time max , Cut knee valgus time max , Cut ankle plflex time max , Cut hip mom flex time max , Cut hip mom abd time max , Cut knee mom flex time max , Cut knee mom abd time max , Cut impulse , Cut torso pelvis flex ic ,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Cut torso pelvis latflex ic , Cut torso pelvis lrot ic , Cut torso ground flex ic , Cut torso ground latflex ic , Cut torso ground lrot ic , Cut torso lrot speed ic , Cut stance time, Cut cutting angle , Cut approach speed ic , Cut foot rrot ic , Cut toe landing ic , Cut cut width com ic , Cut cut depth com ic , Cut cut width pelvis ic , Cut cut depth pelvis ic , Cut momentarm sagittal 40 , Cut momentarm frontal 40 , Cut simplemom frontal maxmom , Cut momentarm frontal maxmom , Cut grf filt maxmom	
Karnuta *et al*[15]	Baseball	13,982	6,521	Any Body Part	XGBoost	Previous injury, Weighted cutter runs per 100 pitches, Wins above replacement, Number pinch hits, Run expectancy wins, Runs batted in, Weighted split finger runs per 100 pitches, Total disabled list days, Home runs to fly balls ratio, Balls to strikeouts ratio, Number times hit by pitcher, Age, Weighted changeup runs per 100 pitches, Leverage index, 2nd base hits, Ground balls to flyballs ratio, Offensive runs above average, Batting average, Number leg injuries, 1st base hits, (only top 20 features reported based on relative importance)	AUC = 0.76
Karuc *et al*[16]	Not Reported	556	90	Any Body Part	Logistic Regression	Gender, Age, Socioeconomic status, Body fat, Moderate-to-vigorous physical activity (MVPA), Total FMS score, Functional Movement Screen, Training hours per week	AUC = 0.62
Kolodziej *et al*[17]	Football	56	23	Lower Extremity	LASSO Regression	Age, Height, Weight, Postural Control - COP sway (cm), Postural Control - DPSI, Postural Control - Path of platform (mm) , Strength - Trunk (isometric) - Flex (N·m kg−1) , Strength - Trunk (isometric) - Ext (N·m kg−1) , Strength - Trunk (isometric) - Flex + Ext (N·m kg−1) , Strength - Trunk (isometric) - Flex/Ext , Strength - Trunk (isometric) - LatFlex (N·m kg−1) , Strength - Trunk (isometric) - LatFlexr/LatFlexl , Strength - Trunk (isometric) - TransRot (N·m kg−1) , Strength - Trunk (isometric) - TransRotr/TransRotl , Strength -	AUC = 0.63

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Trunk (isometric) - Core Score (N·m kg−1) , Strength - Hip (isometric) - ABD (N·m kg−1) , Strength - Hip (isometric) - ADD (N·m kg−1) , Strength - Hip (isometric) - ABD/ADD , Knee (isokinetic) - Qcon (N·m kg−1) , Knee (isokinetic) - Qconl/Qconr , Knee (isokinetic) - Hcon (N·m kg−1) , Knee (isokinetic) - Hconl/Hconr , Knee (isokinetic) - Qecc (N·m kg−1) , Knee (isokinetic) - Qeccl/Qeccr , Knee (isokinetic) - Hecc (N·m kg−1) , Knee (isokinetic) - Heccl/Heccr , Knee (isokinetic) - Conventional knee ratio: Hcon/Qcon , Knee (isokinetic) - Functional knee ratio: Hecc/ Qcon , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Plantarflexion(+)/Dorsalflexion(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Plantarflexion(+)/Dorsalflexion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Eversion(+)/Inversion(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Eversion(+)/Inversion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Adduction(+)/Abduction(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Flexion(+)/Extension(−) IC ,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Adduction(+)/Abduction(−) PEAK, Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Plantarflexion(+)/Dorsalflexion(−) IC, Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Plantarflexion(+)/Dorsalflexion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Eversion(+)/Inversion(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Eversion(+)/Inversion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Adduction(+)/Abduction(−) PEAK, Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						- Hip - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Adduction(+)/Abduction(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - External Rotation(+)/Internal Rotation(−) PEAK , PEAK joint moments (Nm/kg) - Ankle - Plantarflexion(+)/Dorsalflexion(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - Plantarflexion(+)/Dorsalflexion(−) USSC , PEAK joint moments (Nm/kg) - Ankle - Eversion(+)/Inversion(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - Eversion(+)/Inversion(−) USSC , PEAK joint moments (Nm/kg) - Ankle - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - External Rotation(+)/Internal Rotation(−) USSC, PEAK joint moments (Nm/kg) - Knee - Flexion(+)/Extension(−) SLDL , PEAK joint moments (Nm/kg) - Knee - Flexion(+)/Extension(−) USSC , PEAK joint moments (Nm/kg) - Knee - Adduction(+)/Abduction(−) SLDL , PEAK joint moments (Nm/kg) - Knee - Adduction(+)/Abduction(−) USSC , PEAK joint moments (Nm/kg) - Knee - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Knee - External Rotation(+)/Internal Rotation(−) USSC , PEAK joint moments (Nm/kg) - Hip - Flexion(+)/Extension(−) SLDL , PEAK joint moments (Nm/kg) - Hip - Flexion(+)/Extension(−) USSC , PEAK joint moments (Nm/kg) - Hip - Adduction(+)/Abduction(−) SLDL , PEAK joint moments (Nm/kg) - Hip -	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Adduction(+)/Abduction(−) USSC, PEAK joint moments (Nm/kg) - Hip - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Hip - External Rotation(+)/Internal Rotation(−) USSC , PEAK vGRF (N/kg) - vGRF SLDL , PEAK vGRF (N/kg) - vGRF USSC (ABD, hip abduction; ABD/ADD, ratio between hip abduction and hip adduction; ADD, hip adduction; Conventional knee ratio, ratio between knee flexion concentric and knee extension concentric; Core Score, sum of trunk flexion, trunk extension, trunk lateral flexion right, trunk lateral flexion left, trunk transversal rotation right and trunk transversal rotation left; COP, center of pressure; DPSI, Dynamic Postural Stability Index; Ext, trunk extension; Flex + Ext, sum of trunk flexion and trunk extension; Flex, trunk flexion; Flex/Ext, ratio between trunk flexion and trunk extension; Functional knee ratio, ratio between knee flexion eccentric and knee extension concentric; Hcon, knee flexion concentric; Hecc, knee flexion eccentric; LatFlex, trunk lateral flexion; LatFlexl, trunk lateral flexion left; LatFlexr, trunk lateral flexion right; LatFlexr/LatFlexl, ratio between trunk lateral flexion right and trunk lateral flexion left; Qcon, knee extension concentric; Qecc, knee extension eccentric; TransRot, trunk transversal rotation; TransRotl, trunk transversal rotation left; TransRotr, trunk transversal rotation right; TransRotr/TransRotl, ratio between trunk transversal rotation right and trunk transversal rotation left, IC, initial contact: first instance of ground contact phase; kg, kilogram; N, newton; Nm, newton meter; PEAK, peak value: peak value within the first 100 ms after IC; SLDL, single-leg drop landing; USSC, unanticipated side-step cutting; vGRF, vertical ground reaction force)	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
López-Valenciano *et al*[18]	Soccer and Handball	132	29	Lower Extremity	Decision Tree	Age group, History of MUSINJ last season, Maximal level of play achieved, BMI, Sleep Quality, Sport Devaluation, YBalance-Anterior- Dominant Leg, YBalance-Anterior-Non Dominant Leg, YBalance-omposite-Dominant Leg, YBalance-PosteroLateral-Non Dominant Leg, YBalance-PosteroMedial-Non Dominant Leg, BilaRatio-YBalance-PosteroLateral, BilaRatio-ISOM-HipAdd, PTISOM-HipAdd-Dominant Leg, PTISOM-HipAdd-No Dominant, UniRatio-PTISOM-HipAbd/HipAdd, ROM-ADFKF-Non Dominant Leg, ROM-HFKE-Dominant Leg, ROM-KF-Dominant Leg, ROM-KF-Non Dominant Leg, Core-USNF, Core-USWF, Core-USCD, APT-KECON240º/s-Dominant leg, APT-KECON240º/s-Non Dominant Leg, APT-KECON60º/s-Dominant leg, APT-KECON60º/s-Non Dominant leg, APT-KEECC180º/s-Dominant Leg, APT-KEECC60º/s-Dominant leg, APT-KF ON180º/s-Dominant Leg, APT-KF ON60º/s-Dominant Leg, APT-KF ON60º/s-Non Dominant Leg, APT-KFECC30º/s-Dominant Leg, APT-KFECC60º/s-Non Dominant Leg, BilaRatio-KFCON180º/s, BilaRatio-KFCON240º/s, BilaRatio-KFECC240º/s, PT-KECON180º/s-Non Dominant Leg, PT-KECON240º/s-Non Dominant Leg, PT-KECON300º/s-Dominant Leg, PT-KECON300º/s-Non Dominant Leg, PT-KECON60º/s-Non Dominant Leg, PT-KEECC180º/s-Non Dominant Leg, PT-KFCON180º/s-Dominant Leg, PT-KFCON240º/s- Dominant, PT-KFCON240º/s-Non Dominant Leg, PT-KFCON300º/s-Dominant Leg, PT-KFCON60º/s-Non Dominant Leg, -KFECC180º/s-Non Dominant Leg, -KFECC30º/s-Non Dominant Leg, -KFECC60º/s-Non Dominant Leg, UnilRatio KF/KECON60º/s-Dominant Leg, UniRatio-KF/KECON240-Dominant Leg (1MUSIN: Muscle injury; BMI: body mass index; Bila: bilateral; Uni: unilateral; ISOM. Isometric;	AUC = 0.75

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Add: adduction; Abd: abduction; ROM: range of motion; ADF: ankle dorsi-flexion; KE: knee extension; KF: knee flexion; HF: hip flexion; APT: angle of peak torque; ECC: eccentric; CON: concentric; PT: peak torque; s: seconds; °: degree; USNF: unstable sitting without feedback; USWF: unstable sitting with feedback; USCD: unstable sitting while performing circular displacements with feedback)	
Lövdal *et al*[19]	Long Distance Runners	74	575	Any Body Part	XGBoost	Number of sessions, Number of rest days, Total distance, Max distance (one day), Total distance Z3-5, T1-T2, Sessions in Z5-T1-T2, Sessions in Z3 or faster, Total distance Z3-4, Max distance Z3-4 one day, Total distance Z5-T1-T2, Max distance Z5-T1-T2, Hours alternative training, Number of strength trainings, Average exertion, Minimum exertion, Maximum exertion, Average training success, Minimum training success, Maximum training success, Average recovery, Minimum recovery, Maximum recovery, Total distance week1/week2, Total distance week0/week1, Total distance week0/week2	AUC = 0.72
Lu *et al*[20]	Not Reported	974	215	Knee	Random Forest	Age at injury, Gender, BMI, Race , Hispanic ethnicity , Smoker, Diabetes mellitus , Systemic inflammatory disease, Hypermobility, Right knee, Activity level , Occupation, Malalignment , Sport, Workers' compensation, Tear type, Tear location, Injury mechanism , Concomitant meniscal injury , Concomitant PCL injury, Concomitant MCL injury, Concomitant LCL injury, Concomitant PLC injury, Concomitant patellar instability, Articular cartilage, Received aspiration or injection , Brace, Physical therapy, Graft type, Femoral fixation, Tibial fixation, Concomitant meniscal repair, Concomitant meniscectomy, Initial presentation VAS for pain, Days to return to unrestricted activity, Months of follow-up , Arthritis, Months to arthritis, TKA, Months to TKA	AUC = 0.89

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Lu *et al*[21]	Multiple Disciplines	1,663	237	Knee	Random Forest	Age at injury, Gender, Body mass index, Race, Smoker, Diabetes mellitus, Systemic inflammatory disease, Hypermobility, Right knee, Activity level, Occupation, Malalignment, Sport type, Workers' Compensation, Tear Type, Tear Location, Injury Mechanism, Concomitant Meniscus Injury, Concomitant PCL Injury, Concomitant MCL Injury, Concomitant LCL Injury, Concomitant PLC Injury, Concomitant Patellar Instability, Articular Cartilage, Months to surgery, Femoral Fixation, Tibial Fixation, Graft, Concomitant Meniscal Repair, Concomitant Meniscectomy, Initial Presentation VAS, Received aspiration or Injection, Brace, Physical Therapy, Days to return to sport, Months of follow-up, Secondary Meniscal Tear, Months to Secondary Meniscal Tear	AUC = 0.80
Lu *et al*[22]	Basketball	2,103	736	Lower Extremity	XGBoost	Recent groin injury, Recent ankle injury, Recent concussion, Recent hamstring injury, Recent back injury, Age, Recent quad injury, Previous injury count, Position, Games played, Games started, Minutes per game, Field goals made per game, Field goal attempts per game, Field goal percentage, 3-point shots made per game, 3-point shots attempted per game, 3-point percentage, 2-point shots made per game, 2-point shots attempted per game, 2-point percentage, Effective field goal percentage, Free throws made per game, Free throws attempted per game, Free throw percentage, Offensive rebounds per game, Defensive rebounds per game, Total rebounds per game, Assists per game, Steals per game, Blocks per game, Turnovers per game, Personal fouls per game, Points per game, Player efficiency rating, True shooting percentage, 3-point attempt rate, Free throw attempt rate, Offensive rebound percentage, Defensive rebound percentage, Total rebound percentage, Assist percentage, Steals percentage, Blocks percentage, Turnover	AUC = 0.84

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						percentage, Usage percentage, Offensive win share, Defensive win share, Win shares, Win shares per 48 min, Offensive box ±, Defensive box ±, Box ±, Value over replacement player	
Luu *et al*[23]	Ice Hockey	2,322	6,982	Any Body Part	XGBoost	Player age, Plus/minus (scoring), Penalties in minutes (scoring) Even strength goals, Power play goals (special teams) , Short-handed goals (special teams) , Game-winning goals, Power play assists, Short-handed assists, Shooting percentage, Blocks at even strength, Hits at even strength, Faceoff wins at even strength, Faceoff win percentage at even strength, Relative Fenwick for percentage at even strength, Team on-ice shooting percentage at even strength, Average shift length per game , Games played, Offensive zone start percentage at even strength, Takeaways, Giveaways, Expected +/-, Average time on ice per game while at even strength, Relative Corsi for percentage while at even strength, On-ice goals against per 60 minutes while at even strength, Average time on ice per game while on the power play, Relative Corsi for percentage while on the power play, On-ice goals for per 60 minutes while on the power play, On-ice goals against per 60 minutes while on the power play, Average time on ice per game while short-handed, Relative Corsi for percentage while short-handed , On-ice goals for per 60 minutes while short-handed, On-ice goals against per 60 minutes while short-handed, Total time on ice per season, Number of prior injuries, counted at the end of a season, Goalie age, Goals against average, Quality start percentage, Penalties in minutes, Games started, Losses, Ties plus overtime/shootout losses, Shutouts, Goals allowed percentage relative to league goals allowed percentage, Assists, Minutes played per season	AUC = 0.95

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Lyubovsky *et al*[24]	American Football	101	173	Any Body Part	Logistic Regression	Date, Weekday, Player Id, Position, Class, Starter, Skill Group, Number of injuries, Game, Game Participation, Practice, Conditioning, Duration of training session, RPE, Global Load (sRPE), Sleep Quality, Hours of Sleep , Recovered, Mood, Energy, Soreness, Wellness Quotient , Duration , Distance, Sprint Distance , Power Plays , Energy burned , # Impacts , # Accelerations, # Decelerations, # Sprints, Top Speed, Distance Per Min, Power Score, Work Ratio, Player Load, Player Load Per Min, Distance & Time in Speed Zone (1-5), # of impacts by level of impact (1-5), # Power plays by duration (1-5), Distance, Time & Number in Acceleration Zones (1-5), Distance, Time & Number in Deceleration Zones (1-5), Distance & Time in Power Zones (1-11) , Cardiac Readiness, DC Potential, Adaptation Reserve, Stress, CNS Readiness	Precision = 0.46, Sensitivity = 0.75
Mandorino *et al*[25]	Football	22	27	Any Body Part	SVM	Years from peak height velocity (PHV) , Level of maturation at the chronological age (CA) of observation , Rate of perceived exertion , Subjective internal training load (TL) , Statistical analysis of trainings' variation over time , Overall stress of the training week , Cumulative loads for a period of one week , Cumulative loads for a period of two weeks , Cumulative loads for a period of three weeks , Cumulative loads for a period of four weeks , Recovery status before the training session , Previous day's recovery status , Jump height assessed before the training session , Jump height assessed after the training session , Percentage variation between PRE-CMJ and POST-CMJ	AUC = 0.84
Martins *et al*[26]	Football	36	34	Any Body Part	Ridge Regression	Sectorial position, Age (years), Experience (years), Body mass (kg), Height (cm), TBW (L), BFM (kg), FFM (kg), Previous injury (n), Sit and reach (cm), Push-ups (n), Handgrip right (kg), Handgrip left (kg), CMJ height (cm), SJ height (cm), LS 5m (s), LS	RMSE = 0.59

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						10m (s), LS 35m (s), Estimated VO2 max (L/kg/min), Yoyo (m), Injury frequency (n)	
McCullagh and Whitfort[27]	Australian Football	39	163	Any Body Part	Artificial neural network	Workload, Squeeze test, Soft tissue score, Stress level, Mood, Sleep score, Ankle flexibility, Fatigue, Player perceived performance, Years played, Player durability, Age, (18 other features not declared)	Accuracy = 0.83
Morse *et al*[28]	Military	12,985	97	Any Body Part	Artificial neural network	"125 body measurements and gender"	AUC = 0.70
Oliver *et al*[29]	Football	355	99	Lower Extremity	Decision Tree	Age (y) , Height (cm) , Mass (kg) , BMI (kg/m²) , Leg Length (cm) , Maturity-Offset , 75%Hop L PVGRF (BW) , 75%Hop R PVGRF (BW) , 75%Hop Asym (%) , SLCMJ L PVGRF (BW) , SLCMJ R PVGRF (BW) , SLCMJ PVGRF Asym (%) , SLHD L (% leg length) , SLHD R (% leg length) , SLHD Asym (%) , TJ Knee Valgus L , TJ Knee Valgus R , Y-B (% leg length) L , Y-B (% leg length) R , Y-B Asym (%) (BMI = Body mass index; Asym = asymmetry; BW = body weight; SLCMJ = single leg countermovement jump; SLHD = single leg hop for distance; TJ = Tuck Jump; PVGRF = peak vertical ground reaction force; Y-B = y-balance; 75%Hop = 75% horizontal hop and stick; R = right; L = left)	AUC = 0.66
Peterson and Evans[30]	Not Reported	23	28	Lower Extremity	Dynamic Bayesian Network	Adaptation Reserve (Scale (1-7)), Aerobic Index, Anaerobic Index, Cardiac Readiness (Scale (1-7)), Direct Current Potential (Omega Base) (mV), Fatigue Index (Scale (1-7)), Heart Rate at Anaerobic Threshold (bpm), High Frequency (ms^2), High Frequency Normalized Units, Low Frequency (ms^2), Low Frequency Normalized Units , Low Frequency / High Frequency Ratio , Metabolic Grade (Scale (1-7)), Metabolic Reactive Index , Overall Readiness (Scale (1-7)), Parasympathetic Activity (PNS) (sec), Recovery Pattern (sec), Root Mean Sum of Differences of Successive Intervals (RMSSD) (ms), Share of Aperiodic Influences (sec), Standard Deviation of	Accuracy = 97.56

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Aspirate Waves, Standard Deviation of Normal-to-Normal Intervals (ms), Standard Deviation of Successive Differences (ms), Stress Index (Scale (1-7)), Sympathetic Activity (SNS) (%), Tension Index, Total Power (ms^2), Sleep Duration (Scale (1-5)), Sleep Quality (Scale (1-5)), Fatigue (Scale (1-5)), Stress (Scale (1-5)), Nutrition (Scale (1-5)), Player Load (AU), IMA Jump (ct), IMA Right (ct), IMA Left (ct), IMA Acceleration (ct), IMA Deceleration (ct), IMA Total (ct), Player Load Acute:Chronic, IMA Total Acute:Chronic , RPE, RPE Acute:Chronic	
Piłka *et al*[31]	Football	36	67	Lower Extremity	XGBoost	Player Id, Position of the player, Number of microcycle in season, Cumulative training minutes since season commencement, Cumulative match minutes since season commencement, Number of games played, Match played in microcycle, Total distance covered in training, Distance in meters covered in HSR (19.8–25.2 km/h) during training, Distance in meters covered in Sprint (>25.2 km/h) during training, Player load during training, Training time in microcycle, Accelerations above 2–3 m/s2 during training, Decelerations above 2–3 m/s2 during training, Total distance covered in game, Distance covered in HSR (19.8–25.2 km/h) in game, Distance covered in Sprint (>25.2 km/h) in game, Player load in game, Player game time, Accelerations above 2–3 m/s2 in game, Decelerations above 2–3 m/s2 in game, REG_HSR_R1_A - The sum of HSR values achieved in the current microcycle, to the values achieved in the microcycle preceding the microcycle under analysis., REG_HSR_R1_C - The sum of the HSR values achieved in the microcycle three weeks before the current one, to the values achieved in the microcycle preceding the microcycle under analysis. , REG_HSR_R2 - The HSR values achieved in a match, to the sum of the values achieved in a	Precision = 0.92 Sensitivity = 0.97

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						microcycle, without a match, in the microcycle analyzed. , REG_Sprint_R1_A - The sum of Sprint values achieved in the current microcycle, to the values achieved in the microcycle preceding the microcycle under analysis., REG_Sprint_R1_C - The sum of the Sprint values achieved in the microcycle three weeks before the current one, to the values achieved in the microcycle preceding the microcycle under analysis. , REG_Spring_R2 - The Sprint values achieved in a match, to the sum of the values achieved in a microcycle, without a match, in the microcycle analyzed. , REG_ACC_DEC - The ratio of the sum of acceleration and deceleration achieved in a match, to the sum of values achieved in a microcycle, without a match, in the analyzed microcycle. , REG_ACWR_AC - The sum of the PlayerLoad parameter values from the entire microcycle (match and training)., REG_ACWR_HR - The average value of the PlayerLoad parameter obtained in the current microcycle and the three preceding it from the entire microcycle (match and training)., REG_ACWR - Ratio of values of parameters REG_ACWR_AC and REG_ACWR_HR	
Rommers *et al*[32]	Football	734	368	Any Body Part	XGBoost	Age (y), Height (cm), Weight (kg), Fat percentage (%), BMI (kg/m2), Sitting height (cm), Leg length (cm), Maturity offset (y), Age at PHV (y), SBJ (cm), CMJ (cm), CMJ with arm swing (cm), Curl-ups (#), Sit and reach (cm), Jumping sideways (#), Moving sideways (#), Balancing backwards (#), KTK3 sum score, T-test left (sec), T-test right (sec), Dribbling without ball (sec), Dribbling with ball (sec), Sprint 5 m (sec), Sprint 10 m (sec) , Sprint 20 m (sec), Sprint 30 m (sec), Decay 30 m (sec), YoYo IR test (m), Years of football experience (y)	Precision = 0.85 Sensitivity = 0.85
Rossi *et al*[33]	Football	26	23	Any Body Part	Decision Tree	Distance in meters covered during the training session, Distance in meters covered above 5.5m/s, Distance in meters covered at metabolic power,	AUC = 0.76

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Distance in meters covered by a player with a Metabolic Power is above 25.5W/Kg, Distance in meters covered by a player with a Metabolic Power is above 25.5W/Kg per minute, Distance in meters covered above 25.5W/Kg and below 19.8Km/h, Number of accelerations above 2m/s2, Number of accelerations above 3m/s2, Number of decelerations above 2m/s2, Number of decelerations above 3m/s2, Total of the weighted impacts of magnitude above 2g. Impacts are collisions and step impacts during running, Ratio between DSL and speed intensity, age of players, Body Mass Index: ratio between weight (in kg) and the square of height (in meters), Role of the player, Number of injuries of the players before each training session, Minutes of play in previous games, Number of games played before each training session	
Ruddy *et al*[34]	Australian Football	*2013*: 186 *2015*: 176	*2013*: 27 *2015*: 26	Hamstring	Naïve Bayes	Age (years), Height (cm), Mass (kg), Playing position, ACL injury history, Hamstring strain 12 month injury history, Eccentric hamstring strength - peak force (N)	AUC = 0.60
Ruiz-Pérez *et al*[35]	Futsal	139	25	Lower Extremity	UnderBagging technique with a cost-sensitive SMO	Player position, Current level of play, Dominant leg, Sex, Age, Body mass (kg), Stature (cm), History of lower extremity soft tissue injury last season, Self-perceived chronic ankle instability, Sleep quality, Physical/emotional exhaustion, Reduced sense of accomplishment, Sport devaluation, Stress control, Influence of sport evaluation, Mental skills, Motivation, Team cohesion, PTISOM-HipAbd-Normalized, PTISOM-HipAdd- Normalized, UnRatio-ISOM-HipAbd/HipAdd, BilaRatio-PTISOM-HipAbd, BilaRatio-PTISOM-HipAdd, Y-Balance-Anterior, Y-Balance-PosteroMedial, Y-Balance-PosteroLateral, BilaRatio-Y-Balance-Anterior, BilaRatio-Y-Balance-PosteroMedial, BilaRatio-Y-Balance-PosteroLateral, Y-Balance-Composite, ROM-HFKF, ROM-HFKE, ROM-HE, ROM-HABD,	AUC = 0.77

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						ROM-HIR, ROM-HER, ROM-KF, ROM-AKDFKE, ROM- AKDFKF, ROM-BIL- HFKF, ROM-BIL- HFKE, ROM-BIL- HE, ROM-BIL- HABD, ROM-BIL- HIR, ROM-BIL- HER, ROM-BIL- KF, ROM-BIL- AKDFKE, ROM-BIL- AKDFKF (Bila: bilateral; Uni: unilateral; ISOM: isometric; PT: peak torque; Abd: abduction; Add: adduction; ROM: range of motion; HFKF: hip flexion with the knee flexed; HFKE: hip flexion with the knee extended; HE: Hip extension; HABD: hip abduction at 90º of hip flexion; HIR: hip internal rotation; HER: hip external rotation; KF: knee flexion; AKDFKE: ankle dorsi-flexion with the knee extended; AKDFKF: ankle dorsi-flexion with the knee flexed; BIL: bilateral ratio)	
Senbel *et al*[36]	Basketball	16	11	Any Body Part	XGBoost	Volume load, Monotony, Strain, sRPE, Game score, Physical Performance game performance Capability , Mental Performance game performance Capability , Emotional Balance , Overall Recovery , Muscular Stress , Lack of Activation , Negative Emotional State , Overall Stress , Resting Heart Rate , Heart Rate Variability , Recovery, Sleep Score, Hours in Bed, Hours of Sleep , Sleep Need, Sleep Efficiency , Wake Periods , Sleep Disturbance , Latency min., Cycles, Light Sleep , Awake hours, Sleep Debt hours, Sleep Consistency , Respiratory Rate , Total Cycle Nap, Total Cycle Sleep , REM Sleep , Deep Sleep, Restorative Sleep	F2-Score = 0.83
Shaw *et al*[37]	Military	99	35	Shin	Random Forest	MTSS history, Years run experience , Sex, Average ankle plantarflexion, Average hip external rotation, BMI, Average runs per week, Orthotic history, Average navicular drop, Average distance per run	AUC = 0.95
Thornton *et al*[38]	Rugby League	25	156	Any Body Part	Random Forest	Session rating of perceived exertion (7 day), Session rating of perceived exertion (14 day), Session rating of perceived exertion (21 day), Session rating of perceived exertion (28 day), Total	AUC = 0.74

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						distance (7 day), Total distance (14 day), Total distance (21 day), Total distance (28 day), High-speed-running distance (>5 m/s) (7 day), High-speed-running distance (>5 m/s) (14 day), High-speed-running distance (>5 m/s) (21 day), High-speed-running distance (>5 m/s) (28 day), High-metabolic-power distance (>20 W/kg) (7 day), High-metabolic-power distance (>20 W/kg) (14 day), High-metabolic-power distance (>20 W/kg) (21 day), High-metabolic-power distance (>20 W/kg) (28 day)	

Supplementary Table 2 Table of machine learning and statistical definitions.

Term	Definition
Accuracy	The proportion of the total number of predictions that were correct.[39]
Adaptive synthetic (ADASYN) sampling	Uses a weighted distribution for different minority class examples according to their level of difficulty in learning, where more synthetic data is generated for minority class examples that are harder to learn compared to those minority examples that are easier to learn. [40]
Artificial intelligence	Artificial intelligence (AI) is a field developed to build human-like intelligence in machines.[39]
Artificial Neural Network	A nonlinear regression technique based on one or more hidden layers, inspired by theories about how neurons in the brain work.[41]
Extreme Gradient Boosting	A scalable ensemble technique based on gradient boosting that has demonstrated to be a reliable and efficient machine learning method.[42]
F1-Score	The harmonic mean of precision and sensitivity, giving importance to both factors.[39]
F2-Score	Whereby F1-score gives equal importance to precision and sensitivity, F2-score gives greater weight to sensitivity.[43]
Local-interpretable model-agnostic explanations	LIME typically creates an explanation for a single prediction by any ML model by learning a simpler interpretable model (e.g., linear classifier) around the prediction through generating simulated data around the instance by random perturbation, and obtaining feature importance through applying some form of feature selection.[44]
Machine learning	Machine learning (ML) is an umbrella term that refers to a broad range of algorithms that perform intelligent predictions based on a data set. These data sets are often large, perhaps consisting of millions of unique data points.[45]
Precision	The fraction of positive values out of the total predicted positive instances.[39]
Random Forest	A combination of tree predictors such that each tree depends on the values of a random vector sampled independently and with the same distribution for all trees in the forest.[46]

Random oversampling	The duplication of instances from the minority classes, thereby increasing their representation in the dataset and achieving a more balanced distribution across all classes.[47]
Random Under-Sampling	Under-sampling the majority class samples at random until their numbers matched the number of minority class samples.[48]
Root mean square error	The measure of the differences between values that are predicted by a model and values that are actually observed.[39]
Sensitivity (Recall)	The rate that the event of interest is predicted correctly for all samples having the event.[41]
SHapley Additive exPlanations (SHAP) values	Used to elucidate the ML predictions based on game theory. For example, inputs are referred to as players while the prediction becomes the payout. SHAP determines the contribution of each player to the game.[49]
Specificity	The rate that non-event samples are predicted as non-events.[41]
Synthetic Minority Oversampling Technique (SMOTE)	The minority class is over-sampled by creating “synthetic” examples rather than by over-sampling with replacement.[48]

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Supplementary Materials

Supplementary Table 1 A summary of each reviewed paper.

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Ayala *et al*[1]	Football	96	18	Hamstring	Decision Tree	Age, History of HSI last season, Maximal level of play achieved, Sleep quality, Physical/emotional exhaustion, Reduced sense of accomplishment, YBalance-Ant-Non Dominant Leg, Ybalance-PostMedial-Non Dominant Leg, YBalance-PostLateral-Non Dominant Leg, YBalance-BilaRatio-Anterior, YBalance-BilaRatio-PostLateral, PTISOM-Hadd-Dominant Leg, PTISOM-Hadd-Norm-Non Dominant Leg, PTISOM-Hadd-Norm-Dominant Leg, BilaRatio-PTISOM-Habd- Dominan Leg, ROM-PHFKE-Dominant Leg, ROM-ADFKE-Non Dominant Leg, ROM-PHA-Dominant Leg, ROM-PHA-Non Dominant Leg, ROM-PHER-Dominant Leg, CORE-USNF, PT-QCON180-Dominant Leg, PT-QCON60-Dominant Leg, PT-QCON240-Non Dominant Leg, PT-QCON180-Dominant Leg, PT-HCON300-Non Dominant Leg, PT-HCON300-Dominant Leg, PT-HCON240-Non Dominant Leg, PT-QECC60-Non Dominant Leg, PT-HECC60-Non Dominant Leg, PT-HECC300-Dominant Leg, PT-HECC180-Non Dominant Leg, APT-HCON-Dominant Leg, APT-HECC180-Dorninant Leg, APT-HECC60-Dominant Leg, APT-HECC60-Non Dominant Leg, APT-QCON240-Non Dominant Leg, APT-QECC30-Non Dominant Leg, APT-QECC60-Dominant Leg, APT-QECC60°/s-Non Dominant Leg, 15-T-QECC60-Dominant Leg, 15-T-QECC30-Non Dominant Leg, 15-T-HECC60-Non Dominant Leg, 15-T-HECC180-Non Dominant Leg, 30-T-QECC180-Non Dominant Leg, 30-T-HECC30-Dominant Leg, 45-T-QECC180- Non Dominant Leg, 45-T-HECC60-	AUC = 0.84

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Dominant Leg, 45-T-HECC180- Dominant Leg, UniRatio H/QCONV300-Non Dominant Leg, UniRatio H/QFUN60-Dominant Leg, 15-UniRatio-H30/Q240-Non Dominant Leg, 15-UniRatio H/QFUN180-Dominant Leg, 15-UniRatio H/QCONv60-Dominant Leg, 15-UniRatio H/QCONV240- Dominant Leg, 15-UnilRatio H/QFUNC180-Non Dominant Leg, 30-UniRatioH/QFUNC60-Dominant Leg, 30-UniRatio-H/QCON180-Dominant Leg, 45-UniRatioH/QFUNC60-Non Dominant Leg, 45-UniRatio-H/QFUNC180-Non Dominant Leg, 45-UniRatio-H/QCONV240-Dominant Leg, 45-UniRatio-H/QCONV300-Non-Dominant Leg, 45-UniRatio H/QCONV300-Dominant Leg, BilaRatio-QCON240, BilaRatio-HCON180, BilaRatio-HCON240 (HSI: hamstring strain injury; Bila: bilateral; ISOM: Isometric; Add: adduction; Abd: abduction; ROM: range of motion; ADF: ankle dorsi-flexion; Q: quadriceps; H: hamstring; HF: hip flexion; HER: hip external rotation; Ant: anterior; Post: posterior; APT: angle of peak torque; ECC: eccentric; CON: concentric; PT: peak torque; T: torque; FUNC: functional; CONV: conventional; USNF: unstable sitting without feedback)	
Bird *et al*[2]	Military	689	160	Lower Body & Torso	Recursive Partitioning and Regression Trees	Gender, BMI, Age, Prior injury history, 3-mile run time, MSKI Health Score (SPARTA Force Plates), Risk Group (SPARTA Force Plates), SPARTA Score (SPARTA Force Plates), Readiness score (DARI Markerless Motion Capture), Quality score (DARI Markerless Motion Capture), Performance Score (DARI Markerless Motion Capture)	AUC = 0.57
Briand *et al*[3]	Speed Skating	11	884	Any Body Part	Random Forest	External training load (Number of laps on ice rink), Internal training load (Perceived fatigue), Psychological wellbeing metrics , Heart rate variability , Neuromuscular function , Injury type and location , Training completion	Sensitivity = 0.35 Specificity = 0.81

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Carey *et al*[4]	Australian Football	75	388	Hamstrings	Logistic Regression	EWMA Distance 3 , EWMA MSR 3 , EWMA HSR 3 , EWMA Player Load 3 , EWMA sRPE 3 , EWMA Distance 6 , EWMA MSR 6 , EWMA HSR 6 , EWMA Player Load 6 , EWMA sRPE 6 , EWMA Distance 21 , EWMA MSR:21 , EWMA HSR 21 , EWMA Player Load 21 , EWMA sRPE 21 , EWMA ACWR Distance 3:21 , EWMA ACWR MSR 3:21 , EWMA ACWR HSR 3:21 , EWMA ACWR Player Load 3:21 , EWMA ACWR sRPE 3:21 , EWMA ACWR Distance 6:21 , EWMA ACWR MSR 6:21 , EWMA ACWR HSR 6:21 , EWMA ACWR Player Load 6:21 , EWMA ACWR sRPE 6:21 , Monotony Distance , Monotony MSR , Monotony Player Load , Monotony sRPE , Strain Distance , Strain MSR , Strain Player Load , Strain sRPE , Mean Distance 3 , Mean MSR 3 , Mean HSR 3 , Mean Player Load 3 , Mean sRPE 3 , Mean Distance 6 , Mean MSR 6 , Mean HSR 6 , Mean Player Load 6 , Mean sRPE 6 , Mean Distance 21 , Mean MSR:21 , Mean HSR 21 , Mean Player Load 21 , Mean sRPE 21 , ACWR Distance 3:21 , ACWR MSR 3:21 , ACWR HSR 3:21 , ACWR Player Load 3:21 , ACWR sRPE 3:21 , ACWR Distance 6:21 , ACWR MSR 6:21 , ACWR HSR 6:21 , ACWR Player Load 6:21 , ACWR sRPE 6:21 , Age	AUC = 0.76
Castellanos *et al*[5]	Multiple Disciplines	15,682	595	Concussion	SVM	Expected Depth Chart Position, Primary Collegiate Sport, Cross Country/Track Position, Number of Concussions, History of Concussion, Primary Collegiate Sport, Current Collegiate GPA (Ratio), Current Collegiate GPA (Ratio), Expected Starting Status, Football Helmet Detail, Wears a Mough Guard, Primary Collegiate Sport, High-School GPA (Ratio), Current Academic Year, Handedness, Primary Collegiate Sport, Age, BESS: Total Score, BESS: Foam Score, ADD/ADHD, Race, Estimated Family Income of Parent(s)/Guardian(s), Secondary Sport History, ImPACT: Verbal Memory Composite Score, Height, SCAT 3 Symptom Severity Score, BMI, History of Skipping a School	AUC = 0.73

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Year/Grade, Migraine Headaches, Primary Collegiate Sport, Average Hours of Sleep Each Night (Weeknight), Secondary Sport History, Age, SAC: Total Score, Prescription Birth Control Medication, Secondary Sport History, Alcohol Use in the Past Month, Marijuana Use in the Past Month, Sex, Weight, Wears Protective Equipment, Learning Disorder, Secondary Sport History, BESS: Firm Score, Wears a Mough Guard, SCAT 3 Symptom Number, Secondary Sport History, History of School-Mandated Academic Assistance, Secondary Sport History, ImPACT: Reaction Time Composite Score, Brief Sensation Seeking Scale Score, BMI, Father/Guardian 2 Occupation, Secondary Sport History, CARE Consortium Site, CARE Consortium Site, Depression, CARE Consortium Site, BESS: Total Score, ACT: Math Section Score, Satisfaction With Life Scale Score, Secondary Sport History, Wears a Helmet, Baseball Position, ACT: Total Score, Primary Collegiate Sport, CARE Consortium Site, CARE Consortium Site, Secondary Sport History, Rowing/Crew Position, ImPACT: Visual Memory Composite Score, BSI: Somatization Score, Secondary Sport History, Secondary Sport History, Father/Guardian 2 Highest Completed Education, ACT: Reading Section Score, SAT: Total Score (Ratio), Current Academic Year, Lacrosse Helmet Detail, ACT: Total Score, HADS: Anxiety Score, History of Repeating a School Year/Grade, Secondary Sport History, Prescription Asthma Medication, History of Other Academic Assistance, SAT: Total Score (Ratio), ACT: Math Section Score, ImPACT: Visual Memory Composite Score, Mean Clinical Reaction Time, CogState/Axon: Attention Score, CogState/Axon: Processing Speed Score, CogState/Axon: Working Memory Accuracy Score, CogState/Axon: Working Memory Speed Score, Expected Starting Status,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Prescription Psychostimulant Medication, ACT: Science Section Score, Secondary Sport History, Vision Problems, Wears Wrestling Headgear, History of Concussion, CARE Consortium Site, Average Hours of Sleep Each Night (Weeknight), Primary Collegiate Sport, Ethnicity, CogState/Axon: Learning Score, Mother/Guardian 1 Highest Completed Education, Wears Protective Equipment, SAC: Total Score, Mother/Guardian 1 Occupation, Current Collegiate GPA (Ratio), Prescription Allergy Medication, Migraine Headaches: Any Relative, Headache Disorder (Non-Migraine): Parent, Secondary Sport History, ACT: Total Score, CNS-VS: Verbal Memory Standard Score, Meningitis, Estimated Family Income of Parent(s)/Guardian(s), Short-Form 12: Mental Health Score, Short-Form 12: Physical Health Score, Father/Guardian 2 Occupation, Father/Guardian 2 Occupation, ACT: Writing Section Score, Mother/Guardian 1 Occupation, Height, Rowing/Crew Position, Headache Disorder (Non-Migraine): Any Relative, Primary Collegiate Sport, High-School GPA (Ratio), Prescription Antidepressant Medication, Prescription Non-Narcotic Pain Medication, ACT: Reading Section Score, SCAT 3 Symptom Number, CNS-VS: Visual Memory Standard Score, BESS: Firm Score, Estimated Family Income of Parent(s)/Guardian(s), History of Moderate-Severe Brain Injury, CNS-VS: Composite Memory Standard Score, ACT: Science Section Score, Secondary Sport History, SCAT 3 Symptom Severity Score, ANAM: Procedural Reaction Time Score, CNS-VS: Reaction Time Standard Score, Secondary Sport History, Estimated Family Income of Parent(s)/Guardian(s), ImPACT: Verbal Memory Composite Score, BSI: Anxiety Score, Current Academic Year, CNS-VS: Visual Memory Standard Score, Secondary Sport	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						History, Prescription Acid Reflux/Heartburn Medication, Mother/Guardian 1 Highest Completed Education, Migraine Headaches: Sibling, Secondary Sport History, King Devick Baseline Score, Age at Time of First Concussion, Secondary Sport History, Schizophrenia, CNS-VS: Neurocognition Index Standard Score, Satisfaction With Life Scale Score, VOMS: Horizontal VOR (Symptoms), Age at Time of Most Recent Concussion, Father/Guardian 2 Highest Completed Education, ACT: English Section Score, ANAM: Code Substitution Score, King Devick Baseline Score, ANAM: Matching to Sample Score, Balance Disorder, CogState/Axon: Working Memory Speed Score, ImPACT: Visual Motor Speed Composite Score, ImPACT: Visual Memory Composite Score, Secondary Sport History, ImPACT: Verbal Memory Composite Score, CNS-VS: Cognitive Flexibility Standard Score, Symptomatic Days (Maximum Duration), CNS-VS: Reaction Time Standard Score, ImPACT: Reaction Time Composite Score, Rowing/Crew Position, History of 504 Plan, CARE Consortium Site, Secondary Sport History, Diabetes, Autism Spectrum Disorder, Brief Sensation Seeking Scale Score, Baseball Position, Over-the-Counter Advil/Ibuprofen, Cross Country/Track Position, CNS-VS: Verbal Memory Standard Score, Secondary Sport History, Mean Clinical Reaction Time, Softball Position, Secondary Sport History, CNS-VS: Composite Memory Standard Score, Race, History of Individualized Education Plan (IEP), ANAM: Simple Reaction Time 2 Score, Mother/Guardian 1 Occupation, Migraine Headaches: Parent, ImPACT: Visual Motor Speed Composite Score, ANAM: Code Substitution Score, Brief Sensation Seeking Scale Score, SCAT 3 Symptom Number, SCAT 3 Symptom Severity Score, Cross Country/Track	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Position, ANAM: Code Substitution Score (Delayed), Over-the-Counter Claritin/Allergy Medication, Current Academic Year, CNS-VS: Complex Attention Standard Score, ANAM: Simple Reaction Time 2 Score, CNS-VS: Complex Attention Standard Score, ANAM: Code Substitution Score (Delayed), Ethnicity, Secondary Sport History, VOMS: Near Point Convergence (Symptoms), CARE Consortium Site, Mother/Guardian 1 Highest Completed Education, CNS-VS: Processing Speed Standard Score, Over-the-Counter Tylenol/Acetaminophen, CNS-VS: Processing Speed Standard Score, ACT: Science Section Score, CNS-VS: Complex Attention Standard Score, ANAM: Simple Reaction Time Score, Primary Collegiate Sport, Estimated Family Income of Parent(s)/Guardian(s), Weight, CNS-VS: Executive Function Standard Score, CogState/Axon: Working Memory Accuracy Score, CNS-VS: Motor Speed Standard Score, Father/Guardian 2 Highest Completed Education, Brain Surgery, CNS-VS: Motor Speed Standard Score, ACT: Math Section Score, HADS: Depression Score, Loss of Consciousness (Minimum Duration), Father/Guardian 2 Occupation, VOMS: Near Point Convergence (Distance), CNS-VS: Verbal Memory Standard Score, Seizure Disorder, High-School GPA (Ratio), CNS-VS: Neurocognition Index Standard Score, ANAM: Matching to Sample Score, Hearing Problems, Father/Guardian 2 Occupation, Bipolar Disorder, American Football Position, Stroke, CNS-VS: Executive Function Standard Score, Estimated Family Income of Parent(s)/Guardian(s), Estimated Family Income of Parent(s)/Guardian(s), Height, CNS-VS: Cognitive Flexibility Standard Score, Post-Traumatic Amnesia (Minimum Duration), History of Other Academic Assistance, Age at Time of Most Recent Concussion, CNS-VS: Psychomotor	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Speed Standard Score, Cross Country/Track Position, SAC: Total Score, BSI: Global Severity Index, ANAM: Mathematical Processing Score, ANAM: Simple Reaction Time Score, ANAM: Mathematical Processing Score, ANAM: Mathematical Processing Score, Memory Disorder, Tobacco Use in the Past Month, Rowing/Crew Position, Mother/Guardian 1 Occupation, ANAM: Mathematical Processing Score, American Football Position, CNS-VS: Psychomotor Speed Standard Score, ImPACT: Verbal Memory Composite Score, Alcohol Use in the Past Month, Weight, ANAM: Procedural Reaction Time Score, Race, Migraine Headaches: Grandparent, CNS-VS: Processing Speed Standard Score, Tennis Position, Mean Clinical Reaction Time, ANAM: Mathematical Processing Score, ACT: English Section Score, Headache Disorder (Non-Migraine): Sibling, SAT: Total Score (Ratio), American Football Position, American Football Position, Marijuana Use in the Past Month, CogState/Axon: Working Memory Speed Score, BESS: Foam Score, ANAM: Matching to Sample Score, ANAM: Simple Reaction Time Score, Primary Collegiate Sport, Race, ANAM: Code Substitution Score, Average Hours of Sleep Each Night (Weekend), CogState/Axon: Processing Speed Score, Cross Country/Track Position, Post-Traumatic Amnesia (Maximum Duration), CNS-VS: Visual Memory Standard Score, CogState/Axon: Learning Score, Average Hours of Sleep Each Night (Weekend), History of 504 Plan, Wears Protective Equipment, CNS-VS: Executive Function Standard Score, ACT: Total Score, Tennis Position, ACT: Math Section Score, CNS-VS: Psychomotor Speed Standard Score, CogState/Axon: Attention Score, ANAM: Procedural Reaction Time Score, ACT: English Section Score, Tennis Position, Sprint Football Position, Prescription Anti-Anxiety	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Medication, Weight, ImPACT: Visual Motor Speed Composite Score, Primary Collegiate Sport, Baseball Position, Balance Disorder, VOMS: Vertical Saccades (Symptoms), Mother/Guardian 1 Highest Completed Education, Satisfaction With Life Scale Score, Alcohol Use in the Past Month, Parkinson's Disease: Parent, ACT: Writing Section Score, American Football Position, Tennis Position, Ice Hockey Position, American Football Position, Tobacco Use in the Past Month, Sprint Football Position, Primary Collegiate Sport, Memory Disorder: Grandparent, Age at Time of First Concussion, Age at Time of Most Recent Concussion, SOT: Composite Balance Score, Secondary Sport History, Wrestling Position, Loss of Consciousness (Maximum Duration), Cross Country/Track Position, CARE Consortium Site, CogState/Axon: Attention Score, CNS-VS: Processing Speed Standard Score, CNS-VS: Cognitive Flexibility Standard Score, SOT: Somatosensory Ratio Score, Wrestling Position, Race, Rowing/Crew Position, History of Repeating a School Year/Grade, Headache Disorder (Non-Migraine): Grandparent, SOT: Composite Balance Score, CNS-VS: Motor Speed Standard Score, ACT: Reading Section Score, Parkinson's Disease: Grandparent, Hockey Helmet Detail, High-School GPA (Ratio), CNS-VS: Neurocognition Index Standard Score, SOT: Visual Ratio Score, Wears a Helmet, Prescription Antipsychotic Medication, Current Academic Year, SOT: Composite Balance Score, Short-Form 12: Mental Health Score, Short-Form 12: Physical Health Score, CNS-VS: Executive Function Standard Score, Softball Position, Father/Guardian 2 Highest Completed Education, SOT: Somatosensory Ratio Score, Secondary Sport History, SOT: Vestibular Ratio Score, VOMS: Visual Motion Sensitivity (Symptoms), Lacrosse Position,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						CNS-VS: Complex Attention Standard Score, Wrestling Position, Headache Disorder (Non-Migraine), Prescription Narcotic Pain Medication, Mean Clinical Reaction Time, ImPACT: Reaction Time Composite Score, Memory Disorder, SOT: Vestibular Ratio Score, Field Hockey Position, SOT: Visual Ratio Score, VOMS: Horizontal Saccades (Symptoms), Primary Collegiate Sport, Lacrosse Position, Number of Concussions, SOT: Visual Ratio Score, Baseball Position, SOT: Vestibular Ratio Score, CNS-VS: Neurocognition Index Standard Score, Illicit Drug Use in the Past Month, Basketball Position, SOT: Somatosensory Ratio Score, BMI, Memory Disorder: Parent, VOMS: Smooth Pursuit (Symptoms), CNS-VS: Cognitive Flexibility Standard Score, Hockey Helmet Detail, VOMS: Near Point Convergence (Symptoms), VOMS: Horizontal Saccades (Symptoms), VOMS: Vertical Saccades (Symptoms), VOMS: Smooth Pursuit (Symptoms), VOMS: Horizontal VOR (Symptoms), VOMS: Vertical VOR (Symptoms), CNS-VS: Executive Function Standard Score, CNS-VS: Composite Memory Standard Score, Average Hours of Sleep Each Night (Weekend), Volleyball Position, Satisfaction With Life Scale Score, VOMS: Visual Motion Sensitivity (Symptoms), Secondary Sport History, CogState/Axon: Learning Score, Other Prescription Medication, Satisfaction With Life Scale Score, Football Helmet Detail, BSI: Depression Score, ACT: English Section Score, Memory Disorder: Sibling, Primary Collegiate Sport, Handedness, BESS: Firm Score, Field Hockey Position, Soccer Position, CogState/Axon: Attention Score, Basketball Position, Hockey Helmet Detail, ANAM: Code Substitution Score (Delayed), Height, Sex, CNS-VS: Psychomotor Speed Standard Score, VOMS: Vertical VOR (Symptoms), American Football Position, Softball	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Position, Sprint Football Position, Mother/Guardian 1 Highest Completed Education, Volleyball Position, Football Helmet Detail, Prescription Birth Control Medication, Short-Form 12: Mental Health Score, ACT: Reading Section Score, Hockey Helmet Detail, Water Polo Position, Loss of Consciousness (Minimum Duration), Ice Hockey Position, Baseball Position, BSI: Depression Score, Primary Collegiate Sport, Soccer Position, Current Academic Year, ANAM: Procedural Reaction Time Score, Hockey Helmet Detail, Number of Concussions, ANAM: Simple Reaction Time 2 Score, Collegiate GPA Not-Applicable (New Freshman), Sprint Football Position, Memory Disorder: Any Relative, ImPACT: Visual Motor Speed Composite Score, Tobacco Use in the Past Month, CNS-VS: Motor Speed Standard Score, Primary Collegiate Sport, Lacrosse Position, Hearing Problems, Illicit Drug Use in the Past Month, Parkinson's Disease: Sibling, Mother/Guardian 1 Occupation, Ethnicity, Wears Wrestling Headgear, Hockey Helmet Detail, Football Helmet Detail, Prescription Sleep Aid/Sedative Medication, Hockey Helmet Detail, Lacrosse Helmet Detail, Hockey Helmet Detail, Ice Hockey Position, Wears a Mough Guard, Sprint Football Position, King Devick Baseline Score, CNS-VS: Reaction Time Standard Score, Field Hockey Position, Sprint Football Position, Sprint Football Position, Sprint Football Position, Sprint Football Position, Field Hockey Position, CNS-VS: Psychomotor Speed Standard Score, HADS: Depression Score, Wrestling Position, Cross Country/Track Position, Wrestling Position, Parkinson's Disease: Any Relative, Headache Disorder (Non-Migraine), BSI: Global Severity Index, CNS-VS: Cognitive Flexibility Standard Score, Ice Hockey Position, Ice Hockey Position,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Short-Form 12: Physical Health Score, Secondary Sport History, Father/Guardian 2 Occupation, Father/Guardian 2 Highest Completed Education	
Connaboy *et al*[6]	Military	140	38	Lower Extremity	Decision Tree	Age, Height, Weight, Body fat, Aerobic capacity, Peak anaerobic power, Mean anaerobic power, R knee extension, R knee flexion, L knee extension, L knee flexion, R knee flexion/extension ratio, L knee flexion/extension ratio, R ankle eversion, L ankle eversion, R ankle inversion, L ankle inversion, R ankle eversion:inversion ratio, L ankle eversion/inversion ratio, Knee extension, Knee flexion, Ankle eversion, Ankle inversion, R hip extension, L hip extension, R knee active extension, L knee active extension, R ankle dorsiflexion, L ankle dorsiflexion, Hip extension, Knee active extension, Ankle dorsiflexion	AUC = 0.91
Farhadian *et al*[7]	Multiple Disciplines	356	55	Mouth	Random Forest	Age (year) , Gender, Father's education , Mother's education, Child's Birth Order, Sport, Experience [years] , Training days per week , Training hour per day, Mouth guard Awareness, Mouth guard Use	Accuracy = 0.89
Goggins *et al*[8]	Cricket	17	50	Any Body Part	Random Forest	Balls bowled, sRPE, Height, Weight, Body mass, Sum of 8 skinfolds, Total shoulder range of motion , Combined elevation , Dorsiflexion lunge test , Straight leg raise test , Total hip range of motion , Grip strength , Total thoracic spine rotation , Rotator cuff Strength , Single leg hop & hold , Broad jump , Sumo Deadlift - 5 rep maximum , Hip thrust - 5 rep maximum , Triple hop test , 10m, 20m, 30, 40m speed , Run Two , 505 agility test , Yo-Yo	AUC = 0.72
Hecksteden *et al*[9]	Football	88	51	Any Body Part	Gradient Boosting Algorithm (GBM)	Age, Playing position, Injury history, Endurance capacity, Sprinting speed, Body composition, SIMS Score, SIMS Pain, Training load, Subjective recovery, Training/Match, Stress imposed (team average sRPE), Period following return-to-play	AUC = 0.62
Henriquez *et al*[10]	Multiple Disciplines	122	53	Lower Extremity	Random Forest	Hip adductor strength, Hip external rotation strength, Straight leg raise, Height, Hip abductor strength, Hip internal rotation strength, Eyes open	AUC = 0.69

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						balance test composite score Ankle dorsiflexion strength, Ankle plantarflexion strength, Primary sport type, Knee flexion strength, Eyes closed balance test composite score Active knee extension, Ankle eversion strength, Ankle inversion strength	
Hsu *et al*[11]	Long Distance Runners	22	10	Kidneys	SVM	Age, Gender, Body Height, Body Mass, Body Mass Index, AKI Stage 0, AKI Stage 1, BUN (mmol/L), Creatinine (mg/dL), GFR (mL/min), Na (mmol/L), K (mmol/L), CK (U/L), CKMB (U/L), TROP T (ug/L), MYO (ng/dL), HDL (mg/dL), TG (mg/dL), LDL (mg/dL), CHOL (mg/dL), BMR (kcal), FFMKG (kg), FFM (%), FATKG (kg), FAT (%), TBW (L), TBW100 (%), ECW (L), ECW100 (%), ICW (L), ICW100 (%), ECWICW, BCM (kg), ECM (kg), CCR (mL/min), PROTEIN (kg), MINERAL (kg), MUSCLE (kg), TBK (g), TBCa (g), GLYCOGEN (g), DRY WEIGHT (kg), ECS (L), ECF (L), PF (L), InterstF (L), Body Volume (L), Body Density (kg) (Nitrogen (BUN, mmol/L), creatinine (mg/dL), sodium (Na, mmol/L), potassium (K, mmol/L), glomerular filtration rate (GFR, mL/min), high-density lipoproteins (HDLs, mg/dL), triglyceride (TG, mg/dL), low-density lipoproteins (LDLs, mg/dL), cholesterol (CHOL, mg/dL), CK (U/L), CK-MB (U/L), MYO (ng/dL), troponin (TROP T, µg/L), basal metabolic rate (BMR) (kcal), fat-free mass (FFMKG, kg), the fatfree mass ratio (FFM, %), fat (FATKG, kg), the fat ratio (FAT, %), total body water volume (TBW, L), the total body water volume ratio (TBW100, %), extracellular water volume (ECW, L), the extracellular water volume ratio (ECW100) (%), intracellular water volume (ICW) (L), the intracellular water volume ratio (ICW100, %), the ECW to ICW ratio (ECWICW), body cell mass (BCM, kg), extracellular mass (ECM, kg), creatinine clearance (CCR, mL/min), GFR (mL/min), protein mass (kg), mineral mass (kg),	Sensitivity = 0.90 Specificity = 1

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						muscle mass (kg), total body K (TBK, g), total body calcium mass (TBCa, g), glycogen mass (g), dry weight (kg), extracellular solids (ECS, L), extracellular fluid (ECF, L), plasma fluid (PF, L), interstitial fluid extra vascular (InterstF, L), body volume (L), and body density mass (kg))	
Huang *et al*[12]	Basketball	16	27	Lower Extremity	XGBoost	sRPE (AU), Menses (AU), Fatigue (AU), Sleep Quality (AU), Muscle Soreness (AU), Stress Levels (AU), Desire (AU), Urine Protein (AU), Urobilinogen (AU), Urine pH (AU), Urine Specific Gravity (AU), Urine Blood (AU), Urine Ketones (AU), Squat 1RM (kg), 15 m × 17 Shuttle Run (s), 5.8 m × 6 Shuttle Run (s), Maximum Vertical Jump (cm), Injury Severity (AU)	Precision = 0.93, Sensitivity = 0.92
Jauhiainen *et al*[13]	Basketball & Floorball	314	57	Knee & Ankle	Logistic Regression	Height (cm), Weight (kg), BMI (kg/m2), Anteversion dominant (deg), Anteversion non-dominant (deg), Knee valgus IC dominant (deg), Knee valgus IC non-dominant (deg), Knee valgus peak dominant (deg), Knee valgus peak non-dominant (deg), Knee flexion IC dominant (deg), Knee flexion IC non-dominant (deg), Knee flexion peak dominant (deg), Knee flexion peak non-dominant (deg), Vertical ground reaction force dominant (N), Vertical ground reaction force non-dominant (N), Knee abduction moment peak dominant (N · m), Knee abduct moment peak non-dominant (N · m), Medial knee displacement dominant (mm), Medial knee displacement non-dominant (mm), Hip flexion peak dominant (deg), Hip flexion peak non-dominant (deg), Ankle dorsiflexion dominant (deg), Ankle dorsiflexion non-dominant (deg), Ankle flexion IC dominant (deg), Ankle flexion IC non-dominant (deg), Hip flexion IC dominant (deg), Hip flexion IC non-dominant (deg), Knee flexion moment peak dominant (N · m), Knee flexion moment peak non-dominant (N · m), Hip flexion moment dominant (N · m), Hip flexion moment non-dominant (N · m),	AUC = 0.65

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Hamstring flexion dominant (deg), Hamstring flexion non-dominant (deg), Hip strength dominant (kg), Hip strength non-dominant (kg), Isokinetic extension dominant (kg), Isokinetic extension non-dominant (kg), Isokinetic flexion dominant (kg), Isokinetic flexion non-dominant (kg), Leg press one repetition maximum (kg), Navicular drop dominant (mm), Navicular drop non-dominant (mm), Exposure (h), Age (yr), Genu recurvatum dominant (deg), Genu recurvatum non-dominant (deg), KT1000 dominant (mm), KT1000 non dominant (mm), Generalized joint laxity (points), Dominant knee previous injuries, Non-dominant knee previous injuries, Dominant ankle previous injuries, Non-dominant ankle previous injuries, Sex (male-female)	
Jauhiainen *et al*[14]	Soccer and Handball	791	60	Knee	SVM	Age tested, Bodymass, Height, Age started elite play, Number of seasons elite play, Match hours avg week, Previous acl, Family acl history, Current acl prevention, Legpress max, Kt1000 predef pull mm, Kt1000 manual pull mm, Ham mobility degrees , Genu recurvatum degrees , Hip anteversion degrees , Knee valgus static , Pelvis forward tilt static, Pelvis l tilt static, Pelvis l rot static, Pelvis width, Femur length , Tibia length , Femur condyle width , Tibia condyle width , Leg length , Quad best, Ham best, H q relation, Singleleg squat hip , Singleleg squat knee , Singleleg dropjump hip, Singleleg dropjump knee, Dropjump bilateral, Anterolateral cm , Mediolateral cm , Posterolateral cm , Hip abduction kg , Naviculardrop, Gl index, Jump hip flex ic , Jump hip flex max , Jump hip abd ic , Jump hip abd max , Jump hip rot ic , Jump knee flex ic , Jump knee flex max , Jump knee valgus ic , Jump knee valgus max , Jump knee rot ic , Jump ankle plflex ic , Jump ankle plflex max , Jump ankle inv ic , Jump ankle inv max , Jump ankle rot ic , Jump hip	AUC = 0.63

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						mom flex max , Jump hip mom flex max100 , Jump hip mom abd max , Jump hip mom abd max100 , Jump knee mom flex max , Jump knee mom flex max100 , Jump knee mom abd max , Jump knee mom abd max100 , Jump ankle mom dflex max , Jump ankle mom dflex max100 , Jump ankle mom inv max , Jump ankle mom inv max100 , Jump grf vert max , Jump grf vert time max , Jump grf med max , Jump grf med time max , Jump grf post max , Jump grf post time max , Jump hip flex time max , Jump knee flex time max , Jump knee valgus time max , Jump ankle plflex time max , Jump hip mom flex time max , Jump hip mom abd time max , Jump knee mom flex time max , Jump knee mom abd time max , Jump impulse , Jump fppa ic , Jump fppa max , Jump com height ic, Jump com height min, Jump com height time min, Jump com vertical speed ic, Jump torso flex ic, Jump height, Cut hip flex ic , Cut hip flex max , Cut hip abd ic , Cut hip abd max , Cut hip rot ic , Cut knee flex ic , Cut knee flex max , Cut knee valgus ic , Cut knee valgus max , Cut knee rot ic , Cut ankle plflex ic , Cut ankle plflex max , Cut ankle inv ic , Cut ankle inv max , Cut ankle rot ic , Cut hip mom flex max , Cut hip mom flex max100 , Cut hip mom abd max , Cut hip mom abd max100 , Cut knee mom flex max , Cut knee mom flex max100 , Cut knee mom abd max , Cut knee mom abd max100 , Cut ankle mom dflex max , Cut ankle mom dflex max100 , Cut ankle mom inv max , Cut ankle mom inv max100 , Cut grf vert max , Cut grf vert time max , Cut grf med max , Cut grf med time max , Cut grf post max , Cut grf post time max , Cut hip flex time max , Cut knee flex time max , Cut knee valgus time max , Cut ankle plflex time max , Cut hip mom flex time max , Cut hip mom abd time max , Cut knee mom flex time max , Cut knee mom abd time max , Cut impulse , Cut torso pelvis flex ic ,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Cut torso pelvis latflex ic , Cut torso pelvis lrot ic , Cut torso ground flex ic , Cut torso ground latflex ic , Cut torso ground lrot ic , Cut torso lrot speed ic , Cut stance time, Cut cutting angle , Cut approach speed ic , Cut foot rrot ic , Cut toe landing ic , Cut cut width com ic , Cut cut depth com ic , Cut cut width pelvis ic , Cut cut depth pelvis ic , Cut momentarm sagittal 40 , Cut momentarm frontal 40 , Cut simplemom frontal maxmom , Cut momentarm frontal maxmom , Cut grf filt maxmom	
Karnuta *et al*[15]	Baseball	13,982	6,521	Any Body Part	XGBoost	Previous injury, Weighted cutter runs per 100 pitches, Wins above replacement, Number pinch hits, Run expectancy wins, Runs batted in, Weighted split finger runs per 100 pitches, Total disabled list days, Home runs to fly balls ratio, Balls to strikeouts ratio, Number times hit by pitcher, Age, Weighted changeup runs per 100 pitches, Leverage index, 2nd base hits, Ground balls to flyballs ratio, Offensive runs above average, Batting average, Number leg injuries, 1st base hits, (only top 20 features reported based on relative importance)	AUC = 0.76
Karuc *et al*[16]	Not Reported	556	90	Any Body Part	Logistic Regression	Gender, Age, Socioeconomic status, Body fat, Moderate-to-vigorous physical activity (MVPA), Total FMS score, Functional Movement Screen, Training hours per week	AUC = 0.62
Kolodziej *et al*[17]	Football	56	23	Lower Extremity	LASSO Regression	Age, Height, Weight, Postural Control - COP sway (cm), Postural Control - DPSI, Postural Control - Path of platform (mm) , Strength - Trunk (isometric) - Flex (N·m kg−1) , Strength - Trunk (isometric) - Ext (N·m kg−1) , Strength - Trunk (isometric) - Flex + Ext (N·m kg−1) , Strength - Trunk (isometric) - Flex/Ext , Strength - Trunk (isometric) - LatFlex (N·m kg−1) , Strength - Trunk (isometric) - LatFlexr/LatFlexl , Strength - Trunk (isometric) - TransRot (N·m kg−1) , Strength - Trunk (isometric) - TransRotr/TransRotl , Strength -	AUC = 0.63

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Trunk (isometric) - Core Score (N·m kg−1) , Strength - Hip (isometric) - ABD (N·m kg−1) , Strength - Hip (isometric) - ADD (N·m kg−1) , Strength - Hip (isometric) - ABD/ADD , Knee (isokinetic) - Qcon (N·m kg−1) , Knee (isokinetic) - Qconl/Qconr , Knee (isokinetic) - Hcon (N·m kg−1) , Knee (isokinetic) - Hconl/Hconr , Knee (isokinetic) - Qecc (N·m kg−1) , Knee (isokinetic) - Qeccl/Qeccr , Knee (isokinetic) - Hecc (N·m kg−1) , Knee (isokinetic) - Heccl/Heccr , Knee (isokinetic) - Conventional knee ratio: Hcon/Qcon , Knee (isokinetic) - Functional knee ratio: Hecc/ Qcon , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Plantarflexion(+)/Dorsalflexion(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Plantarflexion(+)/Dorsalflexion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Eversion(+)/Inversion(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - Eversion(+)/Inversion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Ankle - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - Adduction(+)/Abduction(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Knee - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Flexion(+)/Extension(−) IC ,	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - Adduction(+)/Abduction(−) PEAK, Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during SLDL - Hip - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Plantarflexion(+)/Dorsalflexion(−) IC, Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Plantarflexion(+)/Dorsalflexion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Eversion(+)/Inversion(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - Eversion(+)/Inversion(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Ankle - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - Adduction(+)/Abduction(−) PEAK, Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Knee - External Rotation(+)/Internal Rotation(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Flexion(+)/Extension(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						- Hip - Flexion(+)/Extension(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Adduction(+)/Abduction(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - Adduction(+)/Abduction(−) PEAK , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - External Rotation(+)/Internal Rotation(−) IC , Joint kinematics at IC (°) and PEAK (°) during USCC - Hip - External Rotation(+)/Internal Rotation(−) PEAK , PEAK joint moments (Nm/kg) - Ankle - Plantarflexion(+)/Dorsalflexion(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - Plantarflexion(+)/Dorsalflexion(−) USSC , PEAK joint moments (Nm/kg) - Ankle - Eversion(+)/Inversion(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - Eversion(+)/Inversion(−) USSC , PEAK joint moments (Nm/kg) - Ankle - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Ankle - External Rotation(+)/Internal Rotation(−) USSC, PEAK joint moments (Nm/kg) - Knee - Flexion(+)/Extension(−) SLDL , PEAK joint moments (Nm/kg) - Knee - Flexion(+)/Extension(−) USSC , PEAK joint moments (Nm/kg) - Knee - Adduction(+)/Abduction(−) SLDL , PEAK joint moments (Nm/kg) - Knee - Adduction(+)/Abduction(−) USSC , PEAK joint moments (Nm/kg) - Knee - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Knee - External Rotation(+)/Internal Rotation(−) USSC , PEAK joint moments (Nm/kg) - Hip - Flexion(+)/Extension(−) SLDL , PEAK joint moments (Nm/kg) - Hip - Flexion(+)/Extension(−) USSC , PEAK joint moments (Nm/kg) - Hip - Adduction(+)/Abduction(−) SLDL , PEAK joint moments (Nm/kg) - Hip -	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Adduction(+)/Abduction(−) USSC, PEAK joint moments (Nm/kg) - Hip - External Rotation(+)/Internal Rotation(−) SLDL , PEAK joint moments (Nm/kg) - Hip - External Rotation(+)/Internal Rotation(−) USSC , PEAK vGRF (N/kg) - vGRF SLDL , PEAK vGRF (N/kg) - vGRF USSC (ABD, hip abduction; ABD/ADD, ratio between hip abduction and hip adduction; ADD, hip adduction; Conventional knee ratio, ratio between knee flexion concentric and knee extension concentric; Core Score, sum of trunk flexion, trunk extension, trunk lateral flexion right, trunk lateral flexion left, trunk transversal rotation right and trunk transversal rotation left; COP, center of pressure; DPSI, Dynamic Postural Stability Index; Ext, trunk extension; Flex + Ext, sum of trunk flexion and trunk extension; Flex, trunk flexion; Flex/Ext, ratio between trunk flexion and trunk extension; Functional knee ratio, ratio between knee flexion eccentric and knee extension concentric; Hcon, knee flexion concentric; Hecc, knee flexion eccentric; LatFlex, trunk lateral flexion; LatFlexl, trunk lateral flexion left; LatFlexr, trunk lateral flexion right; LatFlexr/LatFlexl, ratio between trunk lateral flexion right and trunk lateral flexion left; Qcon, knee extension concentric; Qecc, knee extension eccentric; TransRot, trunk transversal rotation; TransRotl, trunk transversal rotation left; TransRotr, trunk transversal rotation right; TransRotr/TransRotl, ratio between trunk transversal rotation right and trunk transversal rotation left, IC, initial contact: first instance of ground contact phase; kg, kilogram; N, newton; Nm, newton meter; PEAK, peak value: peak value within the first 100 ms after IC; SLDL, single-leg drop landing; USSC, unanticipated side-step cutting; vGRF, vertical ground reaction force)	

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
López-Valenciano *et al*[18]	Soccer and Handball	132	29	Lower Extremity	Decision Tree	Age group, History of MUSINJ last season, Maximal level of play achieved, BMI, Sleep Quality, Sport Devaluation, YBalance-Anterior- Dominant Leg, YBalance-Anterior-Non Dominant Leg, YBalance-omposite-Dominant Leg, YBalance-PosteroLateral-Non Dominant Leg, YBalance-PosteroMedial-Non Dominant Leg, BilaRatio-YBalance-PosteroLateral, BilaRatio-ISOM-HipAdd, PTISOM-HipAdd-Dominant Leg, PTISOM-HipAdd-No Dominant, UniRatio-PTISOM-HipAbd/HipAdd, ROM-ADFKF-Non Dominant Leg, ROM-HFKE-Dominant Leg, ROM-KF-Dominant Leg, ROM-KF-Non Dominant Leg, Core-USNF, Core-USWF, Core-USCD, APT-KECON240º/s-Dominant leg, APT-KECON240º/s-Non Dominant Leg, APT-KECON60º/s-Dominant leg, APT-KECON60º/s-Non Dominant leg, APT-KEECC180º/s-Dominant Leg, APT-KEECC60º/s-Dominant leg, APT-KF ON180º/s-Dominant Leg, APT-KF ON60º/s-Dominant Leg, APT-KF ON60º/s-Non Dominant Leg, APT-KFECC30º/s-Dominant Leg, APT-KFECC60º/s-Non Dominant Leg, BilaRatio-KFCON180º/s, BilaRatio-KFCON240º/s, BilaRatio-KFECC240º/s, PT-KECON180º/s-Non Dominant Leg, PT-KECON240º/s-Non Dominant Leg, PT-KECON300º/s-Dominant Leg, PT-KECON300º/s-Non Dominant Leg, PT-KECON60º/s-Non Dominant Leg, PT-KEECC180º/s-Non Dominant Leg, PT-KFCON180º/s-Dominant Leg, PT-KFCON240º/s- Dominant, PT-KFCON240º/s-Non Dominant Leg, PT-KFCON300º/s-Dominant Leg, PT-KFCON60º/s-Non Dominant Leg, -KFECC180º/s-Non Dominant Leg, -KFECC30º/s-Non Dominant Leg, -KFECC60º/s-Non Dominant Leg, UnilRatio KF/KECON60º/s-Dominant Leg, UniRatio-KF/KECON240-Dominant Leg (1MUSIN: Muscle injury; BMI: body mass index; Bila: bilateral; Uni: unilateral; ISOM. Isometric;	AUC = 0.75

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Add: adduction; Abd: abduction; ROM: range of motion; ADF: ankle dorsi-flexion; KE: knee extension; KF: knee flexion; HF: hip flexion; APT: angle of peak torque; ECC: eccentric; CON: concentric; PT: peak torque; s: seconds; °: degree; USNF: unstable sitting without feedback; USWF: unstable sitting with feedback; USCD: unstable sitting while performing circular displacements with feedback)	
Lövdal *et al*[19]	Long Distance Runners	74	575	Any Body Part	XGBoost	Number of sessions, Number of rest days, Total distance, Max distance (one day), Total distance Z3-5, T1-T2, Sessions in Z5-T1-T2, Sessions in Z3 or faster, Total distance Z3-4, Max distance Z3-4 one day, Total distance Z5-T1-T2, Max distance Z5-T1-T2, Hours alternative training, Number of strength trainings, Average exertion, Minimum exertion, Maximum exertion, Average training success, Minimum training success, Maximum training success, Average recovery, Minimum recovery, Maximum recovery, Total distance week1/week2, Total distance week0/week1, Total distance week0/week2	AUC = 0.72
Lu *et al*[20]	Not Reported	974	215	Knee	Random Forest	Age at injury, Gender, BMI, Race , Hispanic ethnicity , Smoker, Diabetes mellitus , Systemic inflammatory disease, Hypermobility, Right knee, Activity level , Occupation, Malalignment , Sport, Workers' compensation, Tear type, Tear location, Injury mechanism , Concomitant meniscal injury , Concomitant PCL injury, Concomitant MCL injury, Concomitant LCL injury, Concomitant PLC injury, Concomitant patellar instability, Articular cartilage, Received aspiration or injection , Brace, Physical therapy, Graft type, Femoral fixation, Tibial fixation, Concomitant meniscal repair, Concomitant meniscectomy, Initial presentation VAS for pain, Days to return to unrestricted activity, Months of follow-up , Arthritis, Months to arthritis, TKA, Months to TKA	AUC = 0.89

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Lu *et al*[21]	Multiple Disciplines	1,663	237	Knee	Random Forest	Age at injury, Gender, Body mass index, Race, Smoker, Diabetes mellitus, Systemic inflammatory disease, Hypermobility, Right knee, Activity level, Occupation, Malalignment, Sport type, Workers' Compensation, Tear Type, Tear Location, Injury Mechanism, Concomitant Meniscus Injury, Concomitant PCL Injury, Concomitant MCL Injury, Concomitant LCL Injury, Concomitant PLC Injury, Concomitant Patellar Instability, Articular Cartilage, Months to surgery, Femoral Fixation, Tibial Fixation, Graft, Concomitant Meniscal Repair, Concomitant Meniscectomy, Initial Presentation VAS, Received aspiration or Injection, Brace, Physical Therapy, Days to return to sport, Months of follow-up, Secondary Meniscal Tear, Months to Secondary Meniscal Tear	AUC = 0.80
Lu *et al*[22]	Basketball	2,103	736	Lower Extremity	XGBoost	Recent groin injury, Recent ankle injury, Recent concussion, Recent hamstring injury, Recent back injury, Age, Recent quad injury, Previous injury count, Position, Games played, Games started, Minutes per game, Field goals made per game, Field goal attempts per game, Field goal percentage, 3-point shots made per game, 3-point shots attempted per game, 3-point percentage, 2-point shots made per game, 2-point shots attempted per game, 2-point percentage, Effective field goal percentage, Free throws made per game, Free throws attempted per game, Free throw percentage, Offensive rebounds per game, Defensive rebounds per game, Total rebounds per game, Assists per game, Steals per game, Blocks per game, Turnovers per game, Personal fouls per game, Points per game, Player efficiency rating, True shooting percentage, 3-point attempt rate, Free throw attempt rate, Offensive rebound percentage, Defensive rebound percentage, Total rebound percentage, Assist percentage, Steals percentage, Blocks percentage, Turnover	AUC = 0.84

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						percentage, Usage percentage, Offensive win share, Defensive win share, Win shares, Win shares per 48 min, Offensive box ±, Defensive box ±, Box ±, Value over replacement player	
Luu *et al*[23]	Ice Hockey	2,322	6,982	Any Body Part	XGBoost	Player age, Plus/minus (scoring), Penalties in minutes (scoring) Even strength goals, Power play goals (special teams) , Short-handed goals (special teams) , Game-winning goals, Power play assists, Short-handed assists, Shooting percentage, Blocks at even strength, Hits at even strength, Faceoff wins at even strength, Faceoff win percentage at even strength, Relative Fenwick for percentage at even strength, Team on-ice shooting percentage at even strength, Average shift length per game , Games played, Offensive zone start percentage at even strength, Takeaways, Giveaways, Expected +/-, Average time on ice per game while at even strength, Relative Corsi for percentage while at even strength, On-ice goals against per 60 minutes while at even strength, Average time on ice per game while on the power play, Relative Corsi for percentage while on the power play, On-ice goals for per 60 minutes while on the power play, On-ice goals against per 60 minutes while on the power play, Average time on ice per game while short-handed, Relative Corsi for percentage while short-handed , On-ice goals for per 60 minutes while short-handed, On-ice goals against per 60 minutes while short-handed, Total time on ice per season, Number of prior injuries, counted at the end of a season, Goalie age, Goals against average, Quality start percentage, Penalties in minutes, Games started, Losses, Ties plus overtime/shootout losses, Shutouts, Goals allowed percentage relative to league goals allowed percentage, Assists, Minutes played per season	AUC = 0.95

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
Lyubovsky *et al*[24]	American Football	101	173	Any Body Part	Logistic Regression	Date, Weekday, Player Id, Position, Class, Starter, Skill Group, Number of injuries, Game, Game Participation, Practice, Conditioning, Duration of training session, RPE, Global Load (sRPE), Sleep Quality, Hours of Sleep , Recovered, Mood, Energy, Soreness, Wellness Quotient , Duration , Distance, Sprint Distance , Power Plays , Energy burned , # Impacts , # Accelerations, # Decelerations, # Sprints, Top Speed, Distance Per Min, Power Score, Work Ratio, Player Load, Player Load Per Min, Distance & Time in Speed Zone (1-5), # of impacts by level of impact (1-5), # Power plays by duration (1-5), Distance, Time & Number in Acceleration Zones (1-5), Distance, Time & Number in Deceleration Zones (1-5), Distance & Time in Power Zones (1-11) , Cardiac Readiness, DC Potential, Adaptation Reserve, Stress, CNS Readiness	Precision = 0.46, Sensitivity = 0.75
Mandorino *et al*[25]	Football	22	27	Any Body Part	SVM	Years from peak height velocity (PHV) , Level of maturation at the chronological age (CA) of observation , Rate of perceived exertion , Subjective internal training load (TL) , Statistical analysis of trainings' variation over time , Overall stress of the training week , Cumulative loads for a period of one week , Cumulative loads for a period of two weeks , Cumulative loads for a period of three weeks , Cumulative loads for a period of four weeks , Recovery status before the training session , Previous day's recovery status , Jump height assessed before the training session , Jump height assessed after the training session , Percentage variation between PRE-CMJ and POST-CMJ	AUC = 0.84
Martins *et al*[26]	Football	36	34	Any Body Part	Ridge Regression	Sectorial position, Age (years), Experience (years), Body mass (kg), Height (cm), TBW (L), BFM (kg), FFM (kg), Previous injury (n), Sit and reach (cm), Push-ups (n), Handgrip right (kg), Handgrip left (kg), CMJ height (cm), SJ height (cm), LS 5m (s), LS	RMSE = 0.59

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						10m (s), LS 35m (s), Estimated VO2 max (L/kg/min), Yoyo (m), Injury frequency (n)	
McCullagh and Whitfort[27]	Australian Football	39	163	Any Body Part	Artificial neural network	Workload, Squeeze test, Soft tissue score, Stress level, Mood, Sleep score, Ankle flexibility, Fatigue, Player perceived performance, Years played, Player durability, Age, (18 other features not declared)	Accuracy = 0.83
Morse *et al*[28]	Military	12,985	97	Any Body Part	Artificial neural network	"125 body measurements and gender"	AUC = 0.70
Oliver *et al*[29]	Football	355	99	Lower Extremity	Decision Tree	Age (y) , Height (cm) , Mass (kg) , BMI (kg/m²) , Leg Length (cm) , Maturity-Offset , 75%Hop L PVGRF (BW) , 75%Hop R PVGRF (BW) , 75%Hop Asym (%) , SLCMJ L PVGRF (BW) , SLCMJ R PVGRF (BW) , SLCMJ PVGRF Asym (%) , SLHD L (% leg length) , SLHD R (% leg length) , SLHD Asym (%) , TJ Knee Valgus L , TJ Knee Valgus R , Y-B (% leg length) L , Y-B (% leg length) R , Y-B Asym (%) (BMI = Body mass index; Asym = asymmetry; BW = body weight; SLCMJ = single leg countermovement jump; SLHD = single leg hop for distance; TJ = Tuck Jump; PVGRF = peak vertical ground reaction force; Y-B = y-balance; 75%Hop = 75% horizontal hop and stick; R = right; L = left)	AUC = 0.66
Peterson and Evans[30]	Not Reported	23	28	Lower Extremity	Dynamic Bayesian Network	Adaptation Reserve (Scale (1-7)), Aerobic Index, Anaerobic Index, Cardiac Readiness (Scale (1-7)), Direct Current Potential (Omega Base) (mV), Fatigue Index (Scale (1-7)), Heart Rate at Anaerobic Threshold (bpm), High Frequency (ms^2), High Frequency Normalized Units, Low Frequency (ms^2), Low Frequency Normalized Units , Low Frequency / High Frequency Ratio , Metabolic Grade (Scale (1-7)), Metabolic Reactive Index , Overall Readiness (Scale (1-7)), Parasympathetic Activity (PNS) (sec), Recovery Pattern (sec), Root Mean Sum of Differences of Successive Intervals (RMSSD) (ms), Share of Aperiodic Influences (sec), Standard Deviation of	Accuracy = 97.56

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Aspirate Waves, Standard Deviation of Normal-to-Normal Intervals (ms), Standard Deviation of Successive Differences (ms), Stress Index (Scale (1-7)), Sympathetic Activity (SNS) (%), Tension Index, Total Power (ms^2), Sleep Duration (Scale (1-5)), Sleep Quality (Scale (1-5)), Fatigue (Scale (1-5)), Stress (Scale (1-5)), Nutrition (Scale (1-5)), Player Load (AU), IMA Jump (ct), IMA Right (ct), IMA Left (ct), IMA Acceleration (ct), IMA Deceleration (ct), IMA Total (ct), Player Load Acute:Chronic, IMA Total Acute:Chronic , RPE, RPE Acute:Chronic	
Piłka *et al*[31]	Football	36	67	Lower Extremity	XGBoost	Player Id, Position of the player, Number of microcycle in season, Cumulative training minutes since season commencement, Cumulative match minutes since season commencement, Number of games played, Match played in microcycle, Total distance covered in training, Distance in meters covered in HSR (19.8–25.2 km/h) during training, Distance in meters covered in Sprint (>25.2 km/h) during training, Player load during training, Training time in microcycle, Accelerations above 2–3 m/s2 during training, Decelerations above 2–3 m/s2 during training, Total distance covered in game, Distance covered in HSR (19.8–25.2 km/h) in game, Distance covered in Sprint (>25.2 km/h) in game, Player load in game, Player game time, Accelerations above 2–3 m/s2 in game, Decelerations above 2–3 m/s2 in game, REG_HSR_R1_A - The sum of HSR values achieved in the current microcycle, to the values achieved in the microcycle preceding the microcycle under analysis., REG_HSR_R1_C - The sum of the HSR values achieved in the microcycle three weeks before the current one, to the values achieved in the microcycle preceding the microcycle under analysis. , REG_HSR_R2 - The HSR values achieved in a match, to the sum of the values achieved in a	Precision = 0.92 Sensitivity = 0.97

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						microcycle, without a match, in the microcycle analyzed. , REG_Sprint_R1_A - The sum of Sprint values achieved in the current microcycle, to the values achieved in the microcycle preceding the microcycle under analysis., REG_Sprint_R1_C - The sum of the Sprint values achieved in the microcycle three weeks before the current one, to the values achieved in the microcycle preceding the microcycle under analysis. , REG_Spring_R2 - The Sprint values achieved in a match, to the sum of the values achieved in a microcycle, without a match, in the microcycle analyzed. , REG_ACC_DEC - The ratio of the sum of acceleration and deceleration achieved in a match, to the sum of values achieved in a microcycle, without a match, in the analyzed microcycle. , REG_ACWR_AC - The sum of the PlayerLoad parameter values from the entire microcycle (match and training)., REG_ACWR_HR - The average value of the PlayerLoad parameter obtained in the current microcycle and the three preceding it from the entire microcycle (match and training)., REG_ACWR - Ratio of values of parameters REG_ACWR_AC and REG_ACWR_HR	
Rommers *et al*[32]	Football	734	368	Any Body Part	XGBoost	Age (y), Height (cm), Weight (kg), Fat percentage (%), BMI (kg/m2), Sitting height (cm), Leg length (cm), Maturity offset (y), Age at PHV (y), SBJ (cm), CMJ (cm), CMJ with arm swing (cm), Curl-ups (#), Sit and reach (cm), Jumping sideways (#), Moving sideways (#), Balancing backwards (#), KTK3 sum score, T-test left (sec), T-test right (sec), Dribbling without ball (sec), Dribbling with ball (sec), Sprint 5 m (sec), Sprint 10 m (sec) , Sprint 20 m (sec), Sprint 30 m (sec), Decay 30 m (sec), YoYo IR test (m), Years of football experience (y)	Precision = 0.85 Sensitivity = 0.85
Rossi *et al*[33]	Football	26	23	Any Body Part	Decision Tree	Distance in meters covered during the training session, Distance in meters covered above 5.5m/s, Distance in meters covered at metabolic power,	AUC = 0.76

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						Distance in meters covered by a player with a Metabolic Power is above 25.5W/Kg, Distance in meters covered by a player with a Metabolic Power is above 25.5W/Kg per minute, Distance in meters covered above 25.5W/Kg and below 19.8Km/h, Number of accelerations above 2m/s2, Number of accelerations above 3m/s2, Number of decelerations above 2m/s2, Number of decelerations above 3m/s2, Total of the weighted impacts of magnitude above 2g. Impacts are collisions and step impacts during running, Ratio between DSL and speed intensity, age of players, Body Mass Index: ratio between weight (in kg) and the square of height (in meters), Role of the player, Number of injuries of the players before each training session, Minutes of play in previous games, Number of games played before each training session	
Ruddy *et al*[34]	Australian Football	*2013*: 186 *2015*: 176	*2013*: 27 *2015*: 26	Hamstring	Naïve Bayes	Age (years), Height (cm), Mass (kg), Playing position, ACL injury history, Hamstring strain 12 month injury history, Eccentric hamstring strength - peak force (N)	AUC = 0.60
Ruiz-Pérez *et al*[35]	Futsal	139	25	Lower Extremity	UnderBagging technique with a cost-sensitive SMO	Player position, Current level of play, Dominant leg, Sex, Age, Body mass (kg), Stature (cm), History of lower extremity soft tissue injury last season, Self-perceived chronic ankle instability, Sleep quality, Physical/emotional exhaustion, Reduced sense of accomplishment, Sport devaluation, Stress control, Influence of sport evaluation, Mental skills, Motivation, Team cohesion, PTISOM-HipAbd-Normalized, PTISOM-HipAdd- Normalized, UnRatio-ISOM-HipAbd/HipAdd, BilaRatio-PTISOM-HipAbd, BilaRatio-PTISOM-HipAdd, Y-Balance-Anterior, Y-Balance-PosteroMedial, Y-Balance-PosteroLateral, BilaRatio-Y-Balance-Anterior, BilaRatio-Y-Balance-PosteroMedial, BilaRatio-Y-Balance-PosteroLateral, Y-Balance-Composite, ROM-HFKF, ROM-HFKE, ROM-HE, ROM-HABD,	AUC = 0.77

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						ROM-HIR, ROM-HER, ROM-KF, ROM-AKDFKE, ROM- AKDFKF, ROM-BIL- HFKF, ROM-BIL- HFKE, ROM-BIL- HE, ROM-BIL- HABD, ROM-BIL- HIR, ROM-BIL- HER, ROM-BIL- KF, ROM-BIL- AKDFKE, ROM-BIL- AKDFKF (Bila: bilateral; Uni: unilateral; ISOM: isometric; PT: peak torque; Abd: abduction; Add: adduction; ROM: range of motion; HFKF: hip flexion with the knee flexed; HFKE: hip flexion with the knee extended; HE: Hip extension; HABD: hip abduction at 90º of hip flexion; HIR: hip internal rotation; HER: hip external rotation; KF: knee flexion; AKDFKE: ankle dorsi-flexion with the knee extended; AKDFKF: ankle dorsi-flexion with the knee flexed; BIL: bilateral ratio)	
Senbel *et al*[36]	Basketball	16	11	Any Body Part	XGBoost	Volume load, Monotony, Strain, sRPE, Game score, Physical Performance game performance Capability , Mental Performance game performance Capability , Emotional Balance , Overall Recovery , Muscular Stress , Lack of Activation , Negative Emotional State , Overall Stress , Resting Heart Rate , Heart Rate Variability , Recovery, Sleep Score, Hours in Bed, Hours of Sleep , Sleep Need, Sleep Efficiency , Wake Periods , Sleep Disturbance , Latency min., Cycles, Light Sleep , Awake hours, Sleep Debt hours, Sleep Consistency , Respiratory Rate , Total Cycle Nap, Total Cycle Sleep , REM Sleep , Deep Sleep, Restorative Sleep	F2-Score = 0.83
Shaw *et al*[37]	Military	99	35	Shin	Random Forest	MTSS history, Years run experience , Sex, Average ankle plantarflexion, Average hip external rotation, BMI, Average runs per week, Orthotic history, Average navicular drop, Average distance per run	AUC = 0.95
Thornton *et al*[38]	Rugby League	25	156	Any Body Part	Random Forest	Session rating of perceived exertion (7 day), Session rating of perceived exertion (14 day), Session rating of perceived exertion (21 day), Session rating of perceived exertion (28 day), Total	AUC = 0.74

Reference	Sport	Participants	Injuries	Injury Location	Proposed Model	Dependent Variables Studied	Performance
						distance (7 day), Total distance (14 day), Total distance (21 day), Total distance (28 day), High-speed-running distance (>5 m/s) (7 day), High-speed-running distance (>5 m/s) (14 day), High-speed-running distance (>5 m/s) (21 day), High-speed-running distance (>5 m/s) (28 day), High-metabolic-power distance (>20 W/kg) (7 day), High-metabolic-power distance (>20 W/kg) (14 day), High-metabolic-power distance (>20 W/kg) (21 day), High-metabolic-power distance (>20 W/kg) (28 day)	

Supplementary Table 2 Table of machine learning and statistical definitions.

Term	Definition
Accuracy	The proportion of the total number of predictions that were correct.[39]
Adaptive synthetic (ADASYN) sampling	Uses a weighted distribution for different minority class examples according to their level of difficulty in learning, where more synthetic data is generated for minority class examples that are harder to learn compared to those minority examples that are easier to learn. [40]
Artificial intelligence	Artificial intelligence (AI) is a field developed to build human-like intelligence in machines.[39]
Artificial Neural Network	A nonlinear regression technique based on one or more hidden layers, inspired by theories about how neurons in the brain work.[41]
Extreme Gradient Boosting	A scalable ensemble technique based on gradient boosting that has demonstrated to be a reliable and efficient machine learning method.[42]
F1-Score	The harmonic mean of precision and sensitivity, giving importance to both factors.[39]
F2-Score	Whereby F1-score gives equal importance to precision and sensitivity, F2-score gives greater weight to sensitivity.[43]
Local-interpretable model-agnostic explanations	LIME typically creates an explanation for a single prediction by any ML model by learning a simpler interpretable model (e.g., linear classifier) around the prediction through generating simulated data around the instance by random perturbation, and obtaining feature importance through applying some form of feature selection.[44]
Machine learning	Machine learning (ML) is an umbrella term that refers to a broad range of algorithms that perform intelligent predictions based on a data set. These data sets are often large, perhaps consisting of millions of unique data points.[45]
Precision	The fraction of positive values out of the total predicted positive instances.[39]
Random Forest	A combination of tree predictors such that each tree depends on the values of a random vector sampled independently and with the same distribution for all trees in the forest.[46]

Random oversampling	The duplication of instances from the minority classes, thereby increasing their representation in the dataset and achieving a more balanced distribution across all classes.[47]
Random Under-Sampling	Under-sampling the majority class samples at random until their numbers matched the number of minority class samples.[48]
Root mean square error	The measure of the differences between values that are predicted by a model and values that are actually observed.[39]
Sensitivity (Recall)	The rate that the event of interest is predicted correctly for all samples having the event.[41]
SHapley Additive exPlanations (SHAP) values	Used to elucidate the ML predictions based on game theory. For example, inputs are referred to as players while the prediction becomes the payout. SHAP determines the contribution of each player to the game.[49]
Specificity	The rate that non-event samples are predicted as non-events.[41]
Synthetic Minority Oversampling Technique (SMOTE)	The minority class is over-sampled by creating “synthetic” examples rather than by over-sampling with replacement.[48]

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