A COMPARISON BETWEEN THE EFFECTS OF LAND AND WATER BASED EXERCISES IN PATIENTS WITH RHEUMATOID ARTHRITIS

by

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DEDICATION

THIS DEDICATION IS DEDICATED TO ALL RHEUMATOID ARTHRITIS SUFFERERS
I WOULD LIKE TO EXPRESS MY SINCERE THANKS AND GRATITUDE TO THE FOLLOWING PERSONS AND INSTITUTIONS FOR THEIR GUIDANCE, WITHOUT WHO’S ASSISTANCE, THIS STUDY WOULD NOT HAVE BEEN POSSIBLE.

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SUBJECTS WHOM PARTICIPATED IN THE STUDY: FOR THEIR TIME, SUPPORT AND WILLINGNESS IN ASSISTING ME.

NATIONAL RESEARCH FOUNDATION: THEIR FINANCIAL ASSISTANCE TOWARDS THIS RESEARCH IS HEREBY ACKNOWLEDGED. OPINIONS EXPRESSED AND CONCLUSIONS ARRIVED AT, ARE THOSE OF THE AUTHOR AND ARE NOT NECESSARILY TO BE ATTRIBUTED TO THE NATIONAL RESEARCH FOUNDATION.

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IV

Synopsis

Title: A comparison between the effects of land and water based exercises in patients with Rheumatoid Arthritis

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Rheumatoid Arthritis (RA) is the most common type of chronic inflammatory arthritis (Thompson, 1998). When appropriately prescribed, therapeutic exercise is useful in the care of patients with RA (Semble et al., 1990).

A pre-test - post-test randomized groups design was adopted for the study to compare the effects of a land- and water-based exercise programme in RA patients. A total of ten subjects, diagnosed with RA functional class I or II according to Steinbrocker, were assigned to either a group performing water-based exercises (W, n=4), a group performing land-based exercises (L, n=4), or a control group, who were requested to continue with their present sedentary lifestyle (C, n=2). For inclusion in the study, subjects were required to be on stable medication. Categories of dependent variables measured, were disease activity, haematology, functional and psychological status as well as physical status.

There was a reduction in total swollen and tender joint counts in both experimental groups, but not the control group. The reduction was greater in group W than group L. Total tender joint count (TJC) decreased by 53% (p<0.10) and the total swollen joint count (SJC) decreased by 31% (p>0.05) in group W. In group L, the total TJC decreased by 4.7% (p>0.05) and the total SJC decreased by 8.5% (p>0.05).
The haematological values remained globally unchanged in all three groups concerning the hemoglobin (Hb) values.

There were changes in the erythrocyte sedimentation rate (ESR) in the groups, however changes were not significant (p>0.05). The ESR decreased by 29% in group W and by 33% in group C. There was a slight increase in group L’s ESR (11.9%) but values remained within the normal range.

There was an improvement in the patients self-assessed disability and psychological status in the experimental groups while there was a deterioration in the control group’s. Health Assessment Questionnaire (HAQ) scores improved by 15% in group W (p>0.05), 18% in group L (p>0.05) and deteriorated by 13% in group C (p>0.05). There was no change in the total Profile of Mood States (POMS) score of the control group, however, significant (p<0.05) improvements were observed in the experimental groups. There was a 163% improvement in group L’s and a 99% improvement in group W’s affective states.

As far as physical condition is concerned, in general, there was an improvement in group W and group L’s physical condition, while there was no improvements noted in group C.

Group W showed the following changes in physical condition:

Body mass decreased by 9.2% (p>0.05). Mean blood pressure values remained unchanged. 50-ft walk time improved by 18% (p<0.05). Right and left grip strength increased by 18% and 35% respectively, (p<0.05). Absolute VO2 max increased by 28% and relative VO2 max increased by 30% (p<0.05). Right knee flexor strength increased by 43% (p<0.05) and left knee flexor strength by 24% (p>0.05). Increases in right and left knee extensor strength were 32% (p>0.05) and 34% (p>0.05) respectively. Improvement in joint mobility was also noted. There was a significant (p<0.05) improvement in both right and left wrist extension range of motion (ROM). Right wrist extension ROM improved by 49% and left wrist extension ROM improved by 31%. Improvements were also noted in wrist flexion ROM however changes were not significant (p>0.05). There was an 12% and 19% increase in right and left wrist flexion ROM respectively. In
addition, there was a 12% (p<0.05) increase in right knee flexion ROM and a 14% increase in left knee flexion ROM (p<0.05).

Group L showed the following changes in physical condition:

Mean body mass and blood pressure remained unchanged. 50-ft walk test time improved by 15% (p<0.05). Right and left grip strength increased by 4.8% and 16.1% respectively (p>0.05). Relative VO2max increased by 16.6% and absolute VO2max by 31% (p<0.05). Right knee flexor strength increased by 22.1% and left knee flexor strength by 23.8% (p>0.05). Increase in right and left knee extensor strength was 9% and 2.4% respectively (p>0.05). Right wrist extension ROM increased by 20.7% and left wrist extension ROM increased by 15.7% (p>0.05). There was a significant (p<0.05) increase in left wrist flexion (7.6%), but right wrist flexion ROM decreased by 2.6% (p>0.05). Improvements in right and left knee flexion ROM were also significant (p<0.05), 9.2% and 7.4%, respectively.

Group C showed the following changes in physical condition:

Mean body mass increased by 2% (p>0.05), while blood pressure and 50-ft walk time remained globally unchanged. Left grip strength decreased by 16% (p>0.05) and right grip strength remained the same. Although not significant (p>0.05), there was a 11% decrease in relative VO2max and a 6.7% decrease in absolute VO2max. Muscle strength also showed deterioration in group C. Right and left knee flexor strength decreased by 1.8% and 12%, respectively (p>0.05). Left knee extensor strength remained unchanged while right knee extensor strength decreased by 9.7% (p>0.05). Right wrist extension ROM decreased by 4.7% and left wrist extension ROM increased by 6.7%, although the increase was not significant (p>0.05). While right wrist flexion ROM decreased by 1.3% and left wrist flexion ROM decreased by 21% (p>0.05). There were no significant (p>0.05) changes in group C’s right and left knee flexion ROM. Right knee flexion ROM decreased by 1.2% and left knee flexion ROM increased by 1.2%.

Based on the above results of the study, both exercise interventions are beneficial in the treatment of RA. Appropriate land-based exercises do not appear to enhance disease
activity, however, the water-based exercise programme was superior in controlling the
disease activity. Further research is required, using larger samples and evaluating the
long-term effects of various exercise interventions.

Key Words: Rheumatoid Arthritis, Exercise Therapy, Rehabilitation, Water-based
Exercises, Land-based Exercises
Titel: ‘n Vergelyking tussen die effek van land en water gebaseerde oefeninge in patiënte met Rheumatoide Arthritis

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Graad: MA (MBK)

Rheumatoide Artritis (RA) is die mees algemeenste tipe kroniese inflammatoriese artritis (Thompson, 1998). Indien dit korrek voorgeskryf word, kan terapeutiese oefeninge waardevol wees in die behandeling van patiënte met RA (Semble, et al., 1990).

‘n Voortoets – natoets lukraak toegewysde groepsontwerp is aangewend tydens die studie, met die doel om ‘n vergelyking te tref tussen die gevolge van ‘n land- en water-gebaseerde oefenprogram vir RA patiënte. ‘n Totaal van tien probante, gediagnoseer met RA funksionele klas I of II (volgens die Steinbrocker klassifikasie stelsel) is toegewys naonderskeidelik ‘n groep wat water-gebaseerde oefeninge doen (W, n = 4), ‘n groep wat land-gebaseerde oefeninge doen (L, n = 4), en ‘n kontrole groep wie gevra is om voort te gaan met hul huidige sedentêre lewensstil. Vir toelating tot die studie is vereis dat proefpersone op stabiele medikasie was. Kategorieë van afhanklike veranderlikes wat gemeet is, sluit in siekte-aktiwiteit, hematologie, funsionale en psigologiese status so wel as fisieke status.

Daar was ‘n afname in die totale geswelde- en teer-gewrig tellings in beide eksperimentele groepe, maar geen verskil in die kontrole groep nie. Die afname was egter groter in groep W as in groep L. In groep W het die totale-teer-gewrigs telling (TJC) met 53% (p<0.10%) en die totale geswelde-gewrigs-telling (SJC) met 31% (p>0.05) onderskeidelik afgeneem. In groep L het die totale TJC afgeneem met 4,7% (p>0.05), en die totale SJC met 8,5% (p>0.05).
IX

Die hematologie waardes het geen veranderinge getoon vir enige van die drie groepe nie met die betrekking tot die hemoglobien. Daar was wel veranderinge in die groepe se eretrosiet sedimentasie tempo (ESR), maar hierdie veranderinge was onbeduidend (p>0.05). Die ESR het afgeneem met 29% in groep W en met 33% in groep C. Daar was a klein toename in groep L se ESR (11,9%), maar die waardes het binne die normale reikwydtes gebly.

Daar was ‘n verbetering in die pasiente se self-geassesseerde gestremdheid en psigologiese status in die eksperimentele groepe, terwyl daar ‘n afname was in die kontrolegroep. Die Gesondheids Evaluering Vraelys (HAQ) het ‘n verbetering van 15% vir groep W getoon (p>0.05), 18% vir groep L (p>0.05) en ‘n negatiewe verandering van 13% vir groep C (p>0.05). Daar was geen veranderinge in die totale gemoedstoestand profile (POMS) vir groep C nie, maar wel beduidende (p<0.05) verbeteringe vir die eksperimentele groepe met onderskeidelik 163% en 99% vir groep L en W onderskeidelik.

Beide groepe L en W het in die algemeen verbeterings in hul fisieke kondisionering getoon, terwyl daar geen verbetering in groep C voorgekom het nie.

Groep W het die volgende veranderinge in hul fisieke kondisionering getoon:

Liggaamsmassa het met 9,2% (p>0.05) afgeneem, terwyl gemiddelde bloeddruk onveranderd gebl. Die 50-voet looptoets se tyd het met 18% (p<0.05) verbeter. Beide regs en linker greepkrag het met onderskeidelik 18% en 35% (p<0.05) verbeter. Absolute \( VO_2\)max het met 28%, en relatiewe \( VO_2\)max het met 30% toegeneem (p<0.05). Regter knie fleksorkrag het met 43% verbeter (p>0.05) en die linker knie fleksorkrag met 24% (p>0.05). Toenames in regter- en linker knie ekstensorkrag was 32% (p>0.05) en 34% (p>0.05) onderskeidelik. Verder was daar ook verbeterings in gewrigsomvang. Daar was beduidende verbeterings (p<0.05) in beide regter en linker gewrigsekstensie bewegingsomvang. Die regter en linker gewrig het verbeterings van onderskeidelik 49% en 31% vertoon. Die verbeteringe van onderskeidelik 12% en 19% vir die regter en linker gewrigs-fleksie was egter nie beduidend nie (p>0.05). Verder was daar beduidende
(p<0.05) verskille van 12% en 14% onderskeidelik vir toenames in regter en linker knie fleksie bewegingsomvang.

Groep L het die volgende veranderinge in hul kondisionering getoont:

Gemiddelde liggaamsmassa en bloeddruk het onveranderd gebly. Die 50-voet looptoets se tyd het met 15% (p<0.05) verbeter. Die regter en linker greepkrag het met onderskeidelik 4,8% en 16,1% (p>0.05) verbeter. Relatiewe VO₂max het met 16,6% toegeneem, terwyl die absolute VO₂max ‘n toename van 31% getoon het (p<0,05). Regte knie fleksorkrag het met 22,1% en linker knie fleksorkrag met 24% (p>0,05) toegeneem. Toenames in regter en linker knie ekstensorkrag was onderskeidelik 9% en 2,4% (p>0,05). Die toenames in regter- en linker gewrigs ekstensie bewegingsomvang was 20,7% en 15,7% (p>0,05) onderskeidelik. Daar was ‘n beduidende toename in linker gewrigs-fleksie van 7,6% (p<0,05), maar regs was daar ‘n afname van 2,6% (p>0,05) in die bewegingsomvang. Verbeterings in beide die regter en linker knie-fleksie bewegingsomvang was beduidend (p>0,05) met 9,2% en 7,4% onderskeidelik.

Groep C se veranderinge in kondisionering was as volg:

Gemiddelde liggaamsmassa het toegeneem met 2% (p>0,05). Beide die bloeddruk en tyd van die 50-voetlooplooptoets het onveranderd gebleef. Die linker greepkrag het met 16% (p>0,05) afgeneem, terwyl die regter greepkrag onveranderd gebleef het. Alhoewel nie beduidend nie (p>0,05), was daar ‘n 11% afname in relatiewe VO₂max en ‘n 6,7% afname in absolute VO₂max. Spierkrag het ook afgeneem in groep C. Regte- en linker- knie fleksorkrag het met onderskeidelik 1,8% en 12% afgeneem (p>0,05). Linker knie ekstensorkrag het onveranderd gebleef, terwyl die regterbeen se waarde afgeneem het met 9,7% (p>0,05). Regtegeowrigeekstensie omvang het met 4,7% afgeneem en linkegeowrigsiekstensie omvang het met 6,7% toegeneem (p>0,05). Regtegeowrigsfleksie omvang het met 1,3% afgeneem, terwyl linkegeowrigsfleksie met 21% afgeneem het (p>0,05). Daar was geen beduidende (p>0,05) veranderinge in groep C se regter en linker knie fleksie omvang nie, regter knie fleksie omvang het met 1,2% afgeneem en linker knie fleksie omvang het met 1,2% verbeter.
Na aanleiding van die studie se resultate is beide intervensies (water- en land-gebasseerde oefeninge) voordelig in die behandeling van RA. Korrekte land-gebasseerde oefeninge blyk nie die toestand van RA te vererger nie, maar die waterterapie (hidroterapie) was meer doeltreffend in die beheer van die siektetoestand. Verdere navorsing met groter populasies is egter nodig om die langtermyn gevolge van verskeie oefeningsintervensies te evalueer.

Sleutelwoorde: Rheumatoide Artritis, Oefeningsterapie, Rehabilitasie, Water-gebasseerde oefeninge; land-gebasseerde oefeninge
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Title</th>
<th>Page No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>I</td>
</tr>
<tr>
<td>DEDICATION</td>
<td>II</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>III</td>
</tr>
<tr>
<td>SYNOPSIS</td>
<td>IV</td>
</tr>
<tr>
<td>SINOPSIS</td>
<td>VIII</td>
</tr>
<tr>
<td>TABLE OF CONTENTS</td>
<td>XIII</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>XVI</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>XXI</td>
</tr>
<tr>
<td>LIST OF APPENDICES</td>
<td>XXII</td>
</tr>
</tbody>
</table>

## CHAPTER ONE: THE PROBLEM

1.1 INTRODUCTION                            | 1        |
1.2 PROBLEM SETTING                         | 3        |
1.3 PURPOSE AND AIM OF THE STUDY            | 4        |
1.4 HYPOTHESIS                              | 4        |

## CHAPTER TWO: LITERATURE REVIEW

2.1 ARTICULATIONS/JOINTS                   | 5        |

2.1.1 CLASSIFICATIONS OF JOINTS            | 6        |

2.1.1.1 IMMOBILE JOINTS (FIBROUS JOINTS/SYNARTHROSES) | 6        |

2.1.1.2 SEMI-MOBILE JOINTS (CARTILAGINOUS JOINTS/AMPHIARTHROSES) | 6        |

2.1.1.3 MOBILE JOINTS (SYNOVIAL JOINTS/DIARTHROSES) | 6        |

2.2 ARTHRITIS IN GENERAL                   | 18       |

2.3 RHEUMATOID ARTHRITIS                   | 18       |

2.3.1 GENERAL DEFINITION                   | 18       |
2.3.2 HISTORY OF RA                        | 19       |
2.3.3 EPIDEMIOLOGY OF RA                   | 20       |

2.3.3.1 INCIDENCE AND PREVALENCE OF RA     | 20       |
2.3.4 PATHOGENESIS IN RA 23
   2.3.4.1 THE STAGES OF RA 24
   2.3.4.2 EXTRA-ARTICULAR DISEASE 30

2.3.5 CLINICAL MANIFESTATIONS OF RA 33
   2.3.5.1 PATTERNS OF ONSET 33
   2.3.5.2 JOINT MANIFESTATIONS OF RA 33

2.3.6 GENERAL MANAGEMENT OF RA 40
   2.3.6.1 MEDICAL MANAGEMENT 40
   2.3.6.2 ALTERNATIVE AND COMPLEMENTARY THERAPIES 41
   2.3.6.3 SURGICAL MANAGEMENT 42
   2.3.6.4 JOINT PROTECTION AND SPLINTING 44
   2.3.6.5 NUTRITION 46
   2.3.6.6 PHYSICAL THERAPY & EXERCISE 47

CHAPTER THREE: METHODS & PROCEDURES 89

3.1 METHODS 89
  3.1.1 SUBJECTS 89
  3.1.2 EQUIPMENT 90

3.2 PROCEDURES 93
  3.2.1 CLINICAL ASSESSMENT 94
  3.2.2 LABORATORY ASSESSMENT 94
  3.2.3 PATIENTS ASSESSMENT 95
  3.2.4 FUNCTIONAL ASSESSMENT 96

3.3 EXERCISE PROGRAMMES 104
  3.3.1 LAND BASED EXERCISE PROGRAMME 104
  3.3.2 WATER BASED EXERCISE PROGRAMME 111
CHAPTER FOUR: RESULTS & DISCUSSIONS

4.1 DISEASE ACTIVITY 119
4.2 HAEMOTOLOGY 122
4.3 ACTIVITIES OF DAILY LIVING AND PSYCHOLOGICAL STATUS 125
4.4 PHYSICAL CONDITION 129

CHAPTER FIVE: SUMMARY, CONCLUSIONS & RECOMMENDATIONS 148

REFERENCES 148

APPENDIX A 163
APPENDIX B 164
APPENDIX C 165
APPENDIX D 167
APPENDIX E 171
APPENDIX F 172
LIST OF FIGURES

FIGURE 1: LATERAL VIEW OF THE EXTENDED RIGHT KNEE AS SEEN IN PARASAGITTAL SECTION, SHOWING MAJOR ANATOMIC FEATURES 5
FIGURE 2: THE CRUCIAL COMPONENTS OF A DIATHRODIAL JOINT 7
FIGURE 3: DIAGRAM OF THE DEVELOPMENT OF A SYNOVIAL JOINT 8
FIGURE 4: ILLUSTRATION OF THE REMODELING CYCLE IN MATURE BONE 10
FIGURE 5: DIFFERENCES IN FUNCTION BETWEEN TYPE A CELLS AND TYPE B CELLS IN THE SYNOVIAL LINING ARE IMPLIED STRONGLY BY THEIR MORPHOLOGY IN THESE ELECTRON MICROGRAPHS 12
FIGURE 6: THE BLACK CIRCLE REPRESENTS THE ONLY PART WITHIN A JOINT THAT IS NOT SURFACED BY SYNOVIAL OR ARTICULAR CARTILAGE 15
FIGURE 7: SCHEMATIC REPRESENTATION OF THE STRUCTURE OF A FIBRIL OF TYPE 1 COLLAGEN 16
FIGURE 8: THE EARLIEST CONVINCING REPRESENTATION IS SEEN IN THE PAINTING HANGING ABOVE THE STAIRS AT THE ROYAL NATIONAL HOSPITAL FOR RHEUMATIC DISEASES IN BATH 20
FIGURE 9: AGE OF ONSET OF RA 21
FIGURE 10: THE MAIN PATHOLOGICAL FEATURES OF RA 23
FIGURE 11: NORMAL JOINT 24
FIGURE 12: THE INFLAMMATORY TRIGGER MECHANISMS 26
FIGURE 13: STAGE 2 RA 27
FIGURE 14: STAGE 3 RA 28
FIGURE 15: STAGE 4 RA 29
FIGURE 16: STAGE 5 RA 30
FIGURE 17: FREQUENCY OF RA IN THE VARIOUS JOINTS 34
FIGURE 18: SWAN-NECK DEFORMITY 35
FIGURE 19: BOUTONNIERE DEFORMITY 35
FIGURE 20: ROENTENGRAMS TAKEN AFTER IMPLANTATION OF A SEMI-CONTRAINED TOTAL Joint PROSTHESIS DEMONSTRATING GOOD CORRECTION OF VARUS DEFORMITY 42
<table>
<thead>
<tr>
<th>FIGURE</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Ring Splint for Boutonniere Deformity Prohibits Flexion ofPIP Joint</td>
<td>46</td>
</tr>
<tr>
<td>22</td>
<td>Pain Cycle</td>
<td>50</td>
</tr>
<tr>
<td>23</td>
<td>Example of a Range-of-Motion Exercise</td>
<td>53</td>
</tr>
<tr>
<td>24</td>
<td>(A) Shoulder Flexion and (B) Abduction Using Overhead Pulleys to Assist the Motion</td>
<td>56</td>
</tr>
<tr>
<td>25</td>
<td>Example of a Strengthening Exercise</td>
<td>59</td>
</tr>
<tr>
<td>26</td>
<td>Example of an Isometric Exercise</td>
<td>60</td>
</tr>
<tr>
<td>27</td>
<td>Example of an Isokinetic Exercise</td>
<td>64</td>
</tr>
<tr>
<td>28</td>
<td>Example of a Functional Mass Movement</td>
<td>65</td>
</tr>
<tr>
<td>29</td>
<td>Example of a Cardiorespiratory Conditioning Exercise</td>
<td>70</td>
</tr>
<tr>
<td>30</td>
<td>Exercise Pyramid</td>
<td>72</td>
</tr>
<tr>
<td>31</td>
<td>Hydrotherapy for RA Patients</td>
<td>73</td>
</tr>
<tr>
<td>32</td>
<td>An Example of a Hand Exercise</td>
<td>77</td>
</tr>
<tr>
<td>33</td>
<td>An Example of a Wrist Exercise</td>
<td>78</td>
</tr>
<tr>
<td>34</td>
<td>An Example of an Elbow Exercise</td>
<td>79</td>
</tr>
<tr>
<td>35</td>
<td>An Example of a Shoulder Exercise</td>
<td>81</td>
</tr>
<tr>
<td>36</td>
<td>An Example of a Hip Exercise</td>
<td>82</td>
</tr>
<tr>
<td>37</td>
<td>An Example of a Knee Exercise</td>
<td>83</td>
</tr>
<tr>
<td>38</td>
<td>An Example of an Ankle Exercise</td>
<td>84</td>
</tr>
<tr>
<td>39</td>
<td>An Example of a Neck Exercise</td>
<td>85</td>
</tr>
<tr>
<td>40</td>
<td>Harpenden Anthropometer</td>
<td>91</td>
</tr>
<tr>
<td>41</td>
<td>Detecto Standing Scale</td>
<td>91</td>
</tr>
<tr>
<td>42</td>
<td>Tycos Sphygmomanometer and Sphenscope</td>
<td>91</td>
</tr>
<tr>
<td>43</td>
<td>Kometon Neo 330 (20 M) Tape Measure and Avant Sport Timer Stop-Watch</td>
<td>92</td>
</tr>
<tr>
<td>44</td>
<td>Cybex Bicycle Ergometer</td>
<td>92</td>
</tr>
<tr>
<td>45</td>
<td>Cybex Norm 7000</td>
<td>92</td>
</tr>
<tr>
<td>46</td>
<td>Baseline TM Goniometer</td>
<td>93</td>
</tr>
<tr>
<td>47</td>
<td>Joint Examination</td>
<td>94</td>
</tr>
</tbody>
</table>
FIGURE 48: BLOOD SAMPLE BEING DRAWN 95
FIGURE 49: QUESTIONNAIRES COMPLETED BY SUBJECTS 95
FIGURE 50: HEIGHT MEASUREMENT 96
FIGURE 51: BODY MASS MEASUREMENT 97
FIGURE 52: BLOOD PRESSURE MEASUREMENT 97
FIGURE 53: 50-FT WALK 98
FIGURE 54: GRIP STRENGTH MEASUREMENT 99
FIGURE 55: AEROBIC CAPACITY 99
FIGURE 56: MUSCLE STRENGTH TESTING 101
FIGURE 57: WRIST EXTENSION MEASUREMENT 101
FIGURE 58: WRIST FLEXION MEASUREMENT 102
FIGURE 59: KNEE EXTENSION MEASUREMENT 103
FIGURE 60: KNEE FLEXION MEASUREMENT 103
FIGURE 61: CYCLING 104
FIGURE 62: STANDING HIP ABDUCTION 105
FIGURE 63: STANDING HIP ADDUCTION 105
FIGURE 64: WALL SQUATS 106
FIGURE 65: STANDING CALF-RAISES 106
FIGURE 66: PELVIC TILT ON SWISS BALL 106
FIGURE 67: CRUNCHES 107
FIGURE 68: SHOULDER ROLLS BACKWARDS 107
FIGURE 69: NARROW-GRAP INCLINE PULL-DOWN 107
FIGURE 70: LATERAL RAISES 108
FIGURE 71: TREADMILL (WALKING) 108
FIGURE 72: HEALTH-WALKER 108
FIGURE 73: CYCLING 109
FIGURE 74: HAMSTRING STRETCH 109
FIGURE 75: KNEE-TO-CHEST STRETCH 109
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>DESCRIPTION</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>THE AMERICAN RHEUMATISM ASSOCIATION 1987 REVISED CRITERIA FOR THE CLASSIFICATION OF RA</td>
<td>21</td>
</tr>
<tr>
<td>II</td>
<td>LIMBERING-UP EXERCISES</td>
<td>57</td>
</tr>
<tr>
<td>III</td>
<td>CRITICAL RANGES OF MOTION THAT SUBSERVE FUNCTION</td>
<td>57</td>
</tr>
<tr>
<td>IV</td>
<td>MUSCLE &amp; JOINTS TARGETTED FOR STRENGTH TRAINING AND STRETCHING</td>
<td>66</td>
</tr>
<tr>
<td>V</td>
<td>FACTORS DIMINISHING HAND-GRASP STRENGTH IN RA</td>
<td>76</td>
</tr>
<tr>
<td>VI</td>
<td>SUBJECT DATA</td>
<td>90</td>
</tr>
<tr>
<td>VII</td>
<td>EQUIPMENT</td>
<td>90</td>
</tr>
<tr>
<td>VIII</td>
<td>WATER &amp; LAND EXERCISE PROGRAMME EQUIPMENT</td>
<td>93</td>
</tr>
<tr>
<td>IX</td>
<td>TOTAL TENDER &amp; SWOLLEN JOINT COUNTS</td>
<td>121</td>
</tr>
<tr>
<td>X</td>
<td>HAEMATOLOGY</td>
<td>124</td>
</tr>
<tr>
<td>XI</td>
<td>TOTAL HAQ AND POMS SCORES</td>
<td>128</td>
</tr>
<tr>
<td>XII</td>
<td>PHYSICAL STATUS</td>
<td>136</td>
</tr>
<tr>
<td>XIII</td>
<td>PHYSICAL STATUS</td>
<td>141</td>
</tr>
<tr>
<td>XIV</td>
<td>PHYSICAL STATUS</td>
<td>147</td>
</tr>
<tr>
<td>Appendix</td>
<td>Description</td>
<td>Page</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>A</td>
<td>Indemnification Form</td>
<td>174</td>
</tr>
<tr>
<td>B</td>
<td>Functional Impairment (Steinbrocker, Functional Impairment Classification)</td>
<td>175</td>
</tr>
<tr>
<td>C</td>
<td>American College of Rheumatology, Rheumatoid Arthritis Clinical Response Criteria (Joint Examination for Soft-Tissue Swelling, Tenderness and Pain During Motion)</td>
<td>176</td>
</tr>
<tr>
<td>D</td>
<td>Health Assessment Questionnaire (Evaluation of the Effect of Treatment on Functional Ability in RA)</td>
<td>178</td>
</tr>
<tr>
<td>E</td>
<td>Profile of Mood States (Identifiable Mood or Affective States)</td>
<td>181</td>
</tr>
<tr>
<td>F</td>
<td>Functional Assessment Form</td>
<td>182</td>
</tr>
</tbody>
</table>