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# Annexure A

# Questionnaires

1. VAS Pain Score
2. Tampa Scale
3. Oswestry Disability Index
4. Functional Rating Index
5. Fear Avoidance Beliefs Questionnaires
6. Exercise Intensity Progression Measurement
7. DN4 Questionnaire

# Visual Analog Scale (VAS)

Please indicate the amount of pain recently experienced by marking an (X) through the line.

100mm VAS scale – Left hand marker “no pain”, right hand marker “extreme pain”.

|_____|

No pain Extreme Pain

# Tampa Scale for Kinesiophobia

(Miller , Kori and Todd 1991)

1 = strongly disagree
2 = disagree
3 = agree
4 = strongly agree

| | | | | |
|---|---|---|---|---|
| 1. I'm afraid that I might injury myself if I exercise | 1 | 2 | 3 | 4 |
| 2. If I were to try to overcome it, my pain would increase | 1 | 2 | 3 | 4 |
| 3. My body is telling me I have something dangerously wrong | 1 | 2 | 3 | 4 |
| 4. My pain would probably be relieved if I were to exercise | 1 | 2 | 3 | 4 |
| 5. People aren't taking my medical condition seriously enough | 1 | 2 | 3 | 4 |
| 6. My accident has put my body at risk for the rest of my life | 1 | 2 | 3 | 4 |
| 7. Pain always means I have injured my body | 1 | 2 | 3 | 4 |
| 8. Just because something aggravates my pain does not mean it is dangerous | 1 | 2 | 3 | 4 |
| 9. I am afraid that I might injure myself accidentally | 1 | 2 | 3 | 4 |
| 10. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening | 1 | 2 | 3 | 4 |
| 11. I wouldn't have this much pain if there weren't something potentially dangerous going on in my body | 1 | 2 | 3 | 4 |
| 12. Although my condition is painful, I would be better off if I were physically active | 1 | 2 | 3 | 4 |
| 13. Pain lets me know when to stop exercising so that I don't injure myself | 1 | 2 | 3 | 4 |
| 14. It's really not safe for a person with a condition like mine to be physically active | 1 | 2 | 3 | 4 |
| 15. I can't do all the things normal people do because it's too easy for me to get injured | 1 | 2 | 3 | 4 |
| 16. Even though something is causing me a lot of pain, I don't think it's actually dangerous | 1 | 2 | 3 | 4 |
| 17. No one should have to exercise when he/she is in pain | 1 | 2 | 3 | 4 |

# Oswestry Disability Questionnaire

This questionnaire has been designed to give us information as to how your back or leg pain is affecting your ability to manage in everyday life. Please answer by checking **one box in each section** for the statement which best applies to you. We realise you may consider that two or more statements in any one section apply but please just shade out the spot that indicates the statement **which most clearly describes your problem.**

## Section 1: Pain Intensity

- ☐ I have no pain at the moment
- ☐ The pain is very mild at the moment
- ☐ The pain is moderate at the moment
- ☐ The pain is fairly severe at the moment
- ☐ The pain is very severe at the moment
- ☐ The pain is the worst imaginable at the moment

## Section 2: Personal Care (eg. washing, dressing)

- ☐ I can look after myself normally without causing extra pain
- ☐ I can look after myself normally but it causes extra pain
- ☐ It is painful to look after myself and I am slow and careful
- ☐ I need some help but can manage most of my personal care
- ☐ I need help every day in most aspects of self-care
- ☐ I do not get dressed, wash with difficulty and stay in bed

## Section 3: Lifting

- ☐ I can lift heavy weights without extra pain
- ☐ I can lift heavy weights but it gives me extra pain
- ☐ Pain prevents me lifting heavy weights off the floor but I can manage if they are conveniently placed eg. on a table
- ☐ Pain prevents me lifting heavy weights but I can manage light to medium weights if they are conveniently positioned
- ☐ I can only lift very light weights
- ☐ I cannot lift or carry anything

## Section 4: Walking*

- ☐ Pain does not prevent me walking any distance
- ☐ Pain prevents me from walking more than 2 kilometres
- ☐ Pain prevents me from walking more than 1 kilometre
- ☐ Pain prevents me from walking more than 500 metres
- ☐ I can only walk using a stick or crutches
- ☐ I am in bed most of the time

## Section 5: Sitting

- ☐ I can sit in any chair as long as I like
- ☐ I can only sit in my favourite chair as long as I like
- ☐ Pain prevents me sitting more than one hour
- ☐ Pain prevents me from sitting more than 30 minutes
- ☐ Pain prevents me from sitting more than 10 minutes
- ☐ Pain prevents me from sitting at all

## Section 6: Standing

- ☐ I can stand as long as I want without extra pain
- ☐ I can stand as long as I want but it gives me extra pain
- ☐ Pain prevents me from standing for more than 1 hour
- ☐ Pain prevents me from standing for more than 30 minutes
- ☐ Pain prevents me from standing for more than 10 minutes
- ☐ Pain prevents me from standing at all

## Section 7: Sleeping

- ☐ My sleep is never disturbed by pain
- ☐ My sleep is occasionally disturbed by pain
- ☐ Because of pain I have less than 6 hours sleep
- ☐ Because of pain I have less than 4 hours sleep
- ☐ Because of pain I have less than 2 hours sleep
- ☐ Pain prevents me from sleeping at all

## Section 8: Sex Life (if applicable)

- ☐ My sex life is normal and causes no extra pain
- ☐ My sex life is normal but causes some extra pain
- ☐ My sex life is nearly normal but is very painful
- ☐ My sex life is severely restricted by pain
- ☐ My sex life is nearly absent because of pain
- ☐ Pain prevents any sex life at all

## Section 9: Social Life

- ☐ My social life is normal and gives me no extra pain
- ☐ My social life is normal but increases the degree of pain
- ☐ Pain has no significant effect on my social life apart from limiting my more energetic interests e.g. sport
- ☐ Pain has restricted my social life and I do not go out as often
- ☐ Pain has restricted my social life to my home
- ☐ I have no social life because of pain

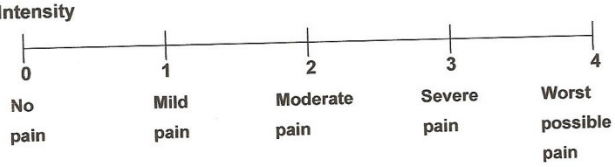
## Section 10: Travelling

- ☐ I can travel anywhere without pain
- ☐ I can travel anywhere but it gives me extra pain
- ☐ Pain is bad but I manage journeys over two hours
- ☐ Pain restricts me to journeys of less than one hour
- ☐ Pain restricts me to short necessary journeys under 30 minutes
- ☐ Pain prevents me from travelling except to receive treatment

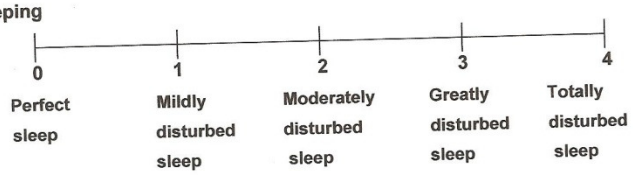
## Functional Rating Index

In order to properly assess your personal condition, we must understand how much your back problems have affected your ability to manage everyday activities. For each item below, please cross the number which most closely describes your condition now.

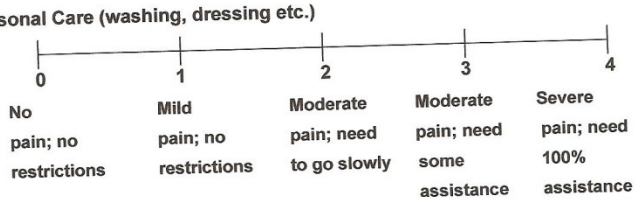
**1. Pain Intensity**



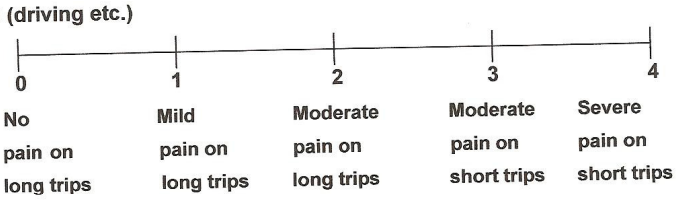

**2. Sleeping**



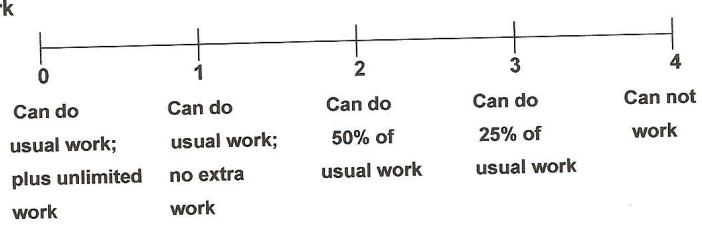

**3. Personal Care (washing, dressing etc.)**



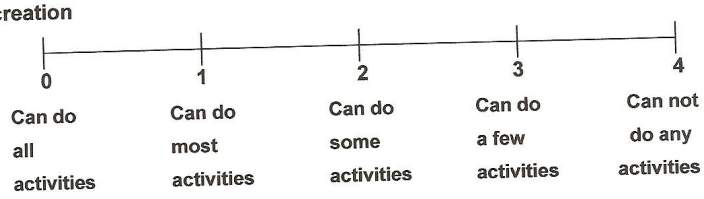
4. Travel (driving etc.)



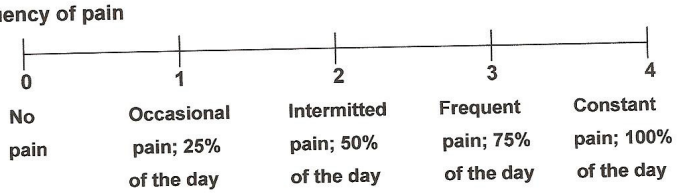

5. Work



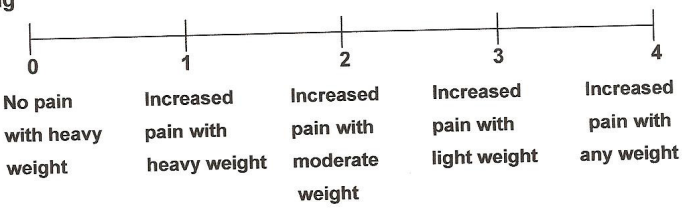

6. Recreation



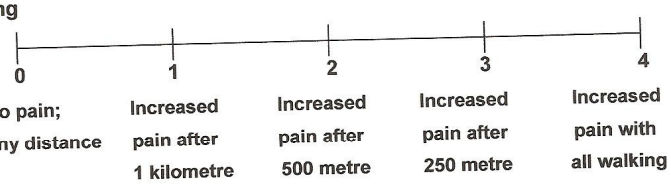
**7. Frequency of pain**



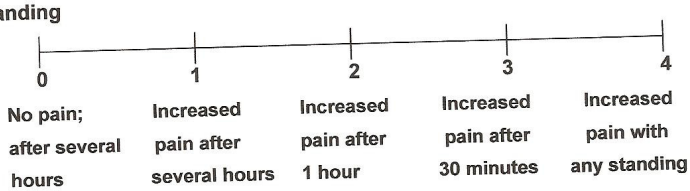

**8. Lifting**




**9. Walking**




**10. Standing**



## *FABQ*

Here are some of the things which other people have told us about their pain. For each statement please cross the number to say how much physical activities such as bending, lifting, walking or driving affect or would affect YOUR back trouble.

**0 1 2 3 4 5 6**

**Completely disagree (CD)** **Unsure (U)** **Completely agree (CA)**

| | | CD | | | U | | | CA |
|---|---|---|---|---|---|---|---|---|
| 1. | My pain was caused by physical activity. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 2. | Physical activity makes my pain worse. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 3. | Physical activity may harm my back. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 4. | I should not do physical activities which (might) make my pain worse. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 5. | I cannot do physical activities which (might) make my pain worse. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

**The following statements are about how your NORMAL work affect your back pain.**

| | | CD | | | U | | | CA |
|---|---|---|---|---|---|---|---|---|
| 6. | My pain was caused by my work or by an accident at work. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 7. | My work aggravated my trouble. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 8. | I have claim for compensation for my pain. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

| | | CD | | | | | | U |
|---|---|---|---|---|---|---|---|---|
| **CA** | | | | | | | | |
| 9. | My work is too heavy for me. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 10. | My work makes or would make my pain worse. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 11. | My work might harm my back. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 12. | I should not do my normal work with my present pain. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 13. | I cannot do my normal work with my present pain. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 14. | I cannot do my normal work till my pain is treated. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 15. | I do not think that I will be able to work normally within 3 months. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| 16. | I do not think that I will ever be able to do my present work normally. | 0 | 1 | 2 | 3 | 4 | 5 | 6 |

**Exercise Intensity Progression Measurement:**

Please use the Borg RPE scale provided to rate the intensity (difficulty) of the exercises as they progressed from one programme to the next

| **Exercise** | Programme 1 | Programme 2 | Programme 3 |
|---|---|---|---|
| Cycling | | | |
| Lat Pulldown | | | |
| Cable Exercise | | | |
| Side Bridging | | | |
| Hip Lifts | | | |
| Alt Superman | | | |
| Abdominal Crunch | | | |

**Borg RPE Scale**

| | |
|---|---|
| 6 No exertion at all | 14 |
| 7 Extremely light | 15 Hard (Heavy) |
| 8 | 16 |
| 9 Very light | 17 Very hard |
| 10 | 18 |
| 11 Light | 19 Extremely hard |
| 12 | 20 Maximal exertion |
| 13 Somewhat hard | |

Gunnar Borg, 1998, *Borg's Perceived Exertion and Pain Scales, Human Kinetics, Champaign, IL.*

# DN4 – QUESTIONNAIRE

To estimate the probability of neuropathic pain, please answer yes or no for each item of the following four questions.

## INTERVIEW OF THE PATIENT

**QUESTION 1:**

| **Does the pain have one or more of the following characteristics?** | **YES** | **NO** |
|---|---|---|
| Burning | ❑ | ❑ |
| Painful cold | ❑ | ❑ |
| Electric shocks | ❑ | ❑ |

**QUESTION 2:**

| **Is the pain associated with one or more of the following symptoms in the same area?** | **YES** | **NO** |
|---|---|---|
| Tingling | ❑ | ❑ |
| Pins and needles | ❑ | ❑ |
| Numbness | ❑ | ❑ |
| Itching | ❑ | ❑ |

## EXAMINATION OF THE PATIENT

**QUESTION 3:**

| **Is the pain located in an area where the physical examination may reveal one or more of the following characteristics?** | **YES** | **NO** |
|---|---|---|
| Hypoesthesia to touch | ❑ | ❑ |
| Hypoesthesia to pinprick | ❑ | ❑ |

**QUESTION 4:**

| **In the painful area, can the pain be caused or increased by:** | **YES** | **NO** |
|---|---|---|
| Brushing? | ❑ | ❑ |

**YES = 1 point**
**NO = 0 points**

**Patient's Score: /10**

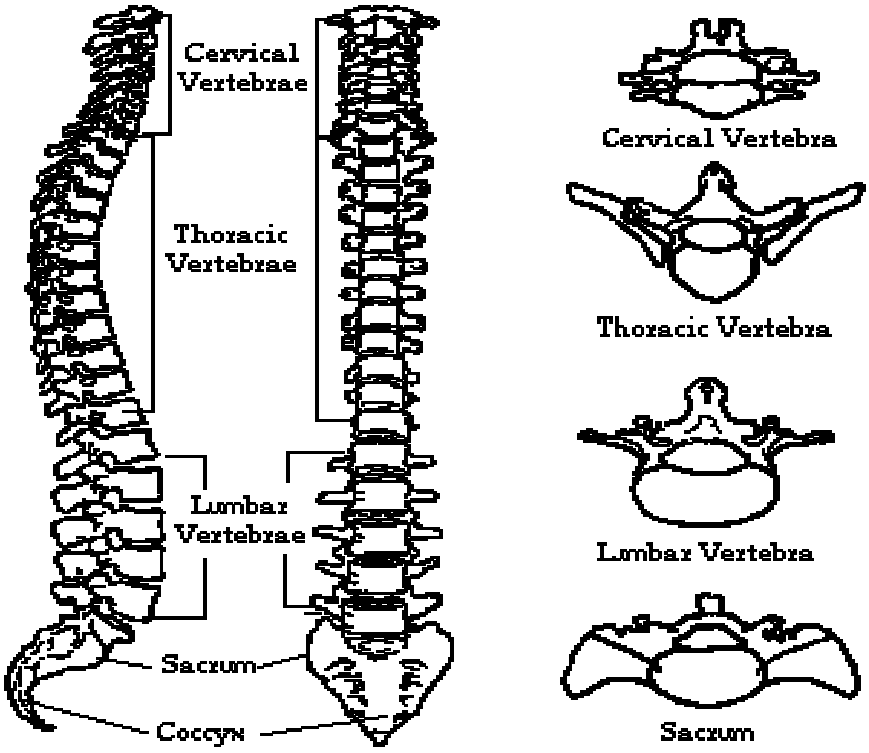
# Annexure B

# BackSchool

# The Only Information You will Ever Needto Treat Your Back Pain

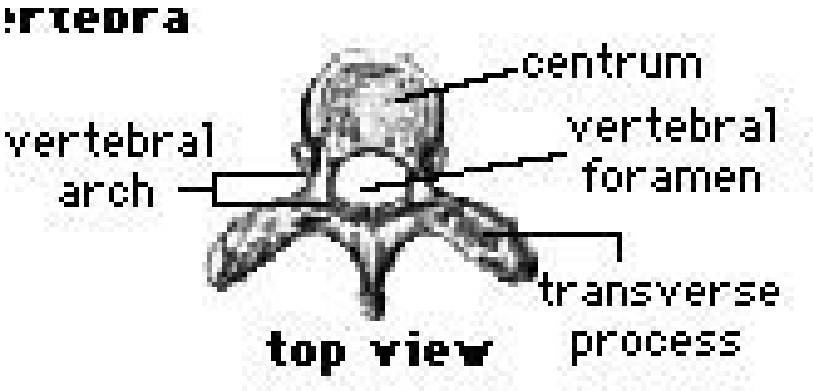
- **Discussion of correct and proper anatomy**: These discussions will focus on the involved anatomical structures of the lower back, and their possible influence in the cause of their problems.

The vertebral column is the starting point. It is composed of many bony parts called **vertebrae**, which are separated from each other by masses of fibro-cartilage called intervertebral disks.




The vertebral column supports the head and trunk of the body, yet is flexible enough to permit movements, such as bending forward and backwards, to the sides and rotation.

A typical vertebra has a drum-shaped body (centrum), which forms the thick anterior portion of the vertebrae.




The intervertebral disks that separates adjacent vertebra are fastened to the roughened upper and lower surfaces of the vertebral bodies. These disks cushion and soften the forces caused by such movements as walking and jumping, which might otherwise fracture vertebrae or injure the brain. Projecting posteriorly (backwards) from each vertebral body are two stalks called **pedicles**, which forms the sides of the vertebral foramen. Two plates called **laminae** arise from the pedicles and fuse in the back to become a **spinous process**. The pedicles, laminae and spinous process together complete a bony **vertebral arch,** around the vertebral foramen, through which the spinal cord passes.

Important muscles include the extensors (longissimus, Iliocostalis, and Multifidus groups), the abdominal muscles (rectus abdominis, external oblique, internal oblique and transverse abdominis) and the Quadratus lumborum. The abdominal muscles work together but also independently. The obliques activate differentially by creating twisting forces and can enhance forward flexion. Rectus abdominis is primarily a flexor. The obliques together with transverse abdominis form a containing belt around the entire abdomen resulting in a stiffening force that assists with spinal stability.

The quadratus lumborum (QL) is by design an effective lateral (sideways) stabilizing muscle. The QL seems to be active during a variety of flexion-dominate Forward-bending), extensor-dominate (backwards bending) and lateral bending (side bending) tasks.

The extensor muscles provide assistance during extension (backwards bending) and seem to be most effective during movements that involve hip bending rather than back bending.

- **The Importance of Stabilization (Bracing)**: This will explain the concept of lumbar stabilization and how to achieve it.

Stability is very important for low back health. Tissue damage results because of joint laxity, and this then leads to joint instability. Ligament failure for example, causes joint instability under load and with motion. Injuries such as end-plate fractures with a loss of disc height can also cause tissue damage that will result in unstable joint behavior. Therefore, to summarize, **instability can both be caused by and be the result of injury**. The goal of stability is to activate the target muscles that are responsible for achieving lumbar stability, and to then maintain that stability. This will then help to prevent future injuries by decreasing the incidence of tissue injuries as a result of instability.

Stability is achieved by the simulations activation of the transvers abdominis, multifidus, quadratus lumborum and oblique muscles, which forms the so-called ‘core stabilizers.’ These muscles have been scientifically shown to act as a shock absorber during movements, which lessens the stress placed on the lower back. Stability is achieved by visualizing and then contracting the muscles of the pelvic floor, which in turn activates the correct muscles. This contracture is then held during movements to ensure that the stabilizing muscles take the pressure off the lower back. This maneuver is also called abdominal bracing. When performed correctly, there will be no visible changes in the abdominal wall. The necessary muscle needs only to activated rather than pulling in the whole abdominal wall.

- **Discussion of proper ergonomics:** Certain tasks and movements in everyday life can worsen lower back problems. These discussions will focus on proper lifting and application techniques.

- When bending to pick up an object, always try to keep the back straight and bend the knees.
- When you have to bend forward and you cannot bend the knees, choose to rather bend at the hips and still keep the back straight.
- When you have to bend forward, remember, that bending forward with the back fully rounded will increase the risk of back trouble. Always try to bend at the hips as this will decrease the pressure on the spine.
- Remember, when performing any type of movement, it is very important to always remember to perform abdominal bracing or stabilizing.
- When picking up a light object off the floor, using the so-called golfers pick-up can be of great benefit as it reduces the pressure on the spine as well as the knees.
- When pushing objects, such as vacuum cleaners, try to push with the hands through the low back as to effectively direct the forces.
- Avoid twisting motions when performing activities like vacuuming. Direct the forces through the low back to minimize the load on the spine.
- When performing an activity like shoveling, resting the hand on the front leg redirects the forces directly to the ground and by-passes the arm and spine linkage.
- When you have to spend a long time standing, don't immediately pick up a heavy object. Stand up first and walk around for a bit before you pick up the object.
- Always carry objects close to your body.

- **Avoiding bed rest and remaining active with normal activities that were avoided because of back pain:** Bed rest is detrimental to lower back problems, and these discussions will focus on the importance of avoiding bed rest.

For years, bed rest has been prescribed for patients. However, in recent years, this practice has been questioned by science, due to the lack of evidence to support the use of bed rest. Bed rest has become some kind of medical dogma, where the use is based solely on habit rather than fact. Medical practitioners even prescribe bed rest for patients who don't think that it is necessary. However, regardless of this, bed rest seems to be a favourite treatment tool for lower back pain. However, The International Paris Task Force on Low Back Pain clearly states that bed rest is contraindicated for chronic low back pain. Bed rest should only be prescribed in the most severe cases, and only for a short period of time. Even then, it should be for no longer than 3 days, after which patients should be strongly encouraged to resume their normal daily activities. This is in part due to the fact that degenerative changes start to set in almost immediately, with the spinal stabilizers suffering from weakening and atrophy (wasting). But by staying active and continuing with activities of daily living as tolerated, this wasting is minimized.

It is because of this that bed rest has to as little as possible when back pain is present. Daily activities have to be continued as tolerated and a person has to go on with their lives. Research has also shown that that bed rest reduces the applied load below the disc osmotic pressure, resulting in a net inflow of fluid. It has been shown that growth in spine length over the usual 8 hours of sleep and then continued bed rest for another period of 32 hours or more is sustained pressure and is suspected to cause back pain. It is proposed that the spine is then stimulated to lay down new bone in response to the higher loads, in this case the higher loads

are due to the swollen discs. This then is interpreted as lying in bed for periods longer than 8 hours actually puts large amounts of stress onto the spine.

- **Discussion of LBP history:** Previous low back pain injury is a major cause factor for future events. The importance of avoiding risk factors for this reason will be discussed.

Past episodes of low back pain is one of the most telling factors for future episodes of low back pain. It is thus very important to take into account previous back pain episodes in order to assess the future likelihood of back pain episodes. This will give a clear picture of factors to take into account.

1) The type of injury has to be taken into account.
2) The length of the back pain episode

- **Discussion of risk factor prevention:** Risk factor prevention will drastically decrease the chances of suffering from a future back pain event. Different prevention factors will be discussed here.

It is important to understand that there certain risk factors that increases the likelihood of suffering from low back pain. These risk factors could be anything from incorrect posture to the tasks of everyday living. It is important to identify these factors to then be able to properly modify them or avoiding them as necessary. The following risk factors have been identified:

1. Static work posture, specifically prolonged trunk flexion and a twisted or side-ways bent trunk posture.
2. **Seated working posture**: Prolonged sitting is problematic for the low back, and this situation is not fully understood in the occupational world. Research has shown that there is an increased incidence of low back injuries with sedentary occupations. The general view is that sitting is easier on the back, but this is not the case. It has been shown with research that there is an increase in pressure on the disks with sitting posture as well as an increase in strain on the annulus. The spinal stabilizing muscles also tend to relax, and thus increase the pressure on the disks because the muscles then handle a much smaller load than which they are supposed to.

Many occupations require prolong periods of sitting, so sitting is unavoidable. A set of guidelines has been developed to decrease the problems caused by prolonged sitting:

– It is better to have more than one sitting posture, as there is no single best sitting posture and then change to another posture every 10 minutes. The idea behind this is to spread the

pressure of sitting to all structures, in order to have all of the structures carry a little load than to have only the same structures carry all of the load.

- Get out of the chair! Sometimes the best advice is to simply get up and take a break every 30-45 minutes.
- Perform some form of exercise during the course of the day.

3. Frequent torso motion, higher spine rotational velocity and spinal rotation deviations.
4. **Frequent lifting, pushing and pulling**.

**5. Vibration exposure, particularly seated whole-body vibration:** Vibration is linked to elevated rates of low back pain, as there is a loss of stabilization capability with exposure to vibration forces.

6. Peak and cumulative low back shear force, compressive force, and extensor moment.
7. **Incidence of slips and falls:** Falling, especially on the behind can increase the risk for prolonged disability, as this position can rupture ligaments in the lower back and hip.
8. **Repeated full lumbar flexion:** This type of motion is to be avoided, as repeated full lumber flexion with only moderate loads has been associated with disc herniation (‘slipped disc’). Spondylitic fractures can also be caused by repeated stress-strain reversals associated with full flexion.
9. **Time of day (or time after getting up from bed):** You should not engage in any type full bending activities when rising from bed, as the spine has spent the night in a position of full flexion and flexing even more would elevate the resulting stresses dangerously high.

10. Excessive magnitude and repetition of compressive loads, shear loads and torsional displacement and moments.
11. Insufficient loading so that tissue strength is compromised.
12. Lack of lower torso muscle endurance.
13. Perturbed motor control patterns.
14. Age.
15. Gender.
16. Abdominal girth

- **Importance and benefits of exercise:** Exercise therapy is regarded as one of the mainstay treatments for chronic low back pain. These discussions will highlight the importance and benefits of exercise therapy, as well as the safety of different exercises.

It is recommended in the scientific literature that patient suffering from chronic low back pain should take part in a structured, therapeutic exercises programme, regardless of the type of exercise done. Exercise is thus strongly recommended above must common therapies. It is also recommended that the exercise programme combine strength training, stretching and fitness training. Research has shown that a well-chosen exercise programme is a powerful tool for preventing occupational low back problems, as this will help to create a stable spine maintained with healthy and wise motor patterns, along with high levels of muscular endurance is protective for the low back.

- **Work to achieve an internal locus of control:** Internal locus of control is correlated with a quicker and more complete recovery. These discussions will be used to try and facilitate this change of perception in the subjects.

Research has shown that thoughts and beliefs may alter behavior by their direct influence on emotional and physical responses, and individuals may thus become active participants in their treatment if they learn skills to deal with their problems. People are perceived to have either an internal or external locus of control. An internal locus of control refers to a person's feeling of control over their own lives. In contrast, an external locus of control is characterized by a perception that a person's life is controlled by factors beyond their control, for example fate, luck and the influence of other people.

- **Pain Coping Strategies:** This section will deal with effective strategies for pain management.

During treatment it has been shown by research that patients who consider that the treatment that they are offered is highly creditable in helping them cope with their pain problem will do much better than people who are no so convinced by the helpfulness of their treatment modalities.

Research has shown that people who tend to perceive pain in a threatening, catastrophic manner as in the assumption of tissue damage, are more likely to experience pain-related fear and anxiety, and will consequently engage in escape or avoidance behavior. Over time, avoiding of activities of everyday life that are perceived to increase pain and tissue damage is repeatedly reinforced by avoiding activities, and this then contributes to symptoms of disuse and disability. This however, is not always the case. Proper patient education and the interest of the patient towards their back pain and the need to understand the truth behind their pain will be an invaluable tool in understanding that activities of daily living has to be continued with proper technique application.

There needs to be a cultivation of greater objectivity, so that cognitive/emotional alarm reactions to painful situations (e.g. “I’ll never survive this……” or “This pain will probably go on forever……”) will become less all-consuming or overwhelming. The process of evaluating these tendencies of the mind to judge whether it is attractive or adversative sensory experience may result in a deconditiong of the alarm reactivity to primary sensations such as physical pain. Thus, while the physical experience of pain may remain largely unchanged, the emotional and cognitive components of the pain experience may be significantly diminished, resulting in less suffering and distress.

Research suggests that the psychological construct of control (e.g. sense of control, self-efficacy) may have important implications for mental and physical health including the management of pain. Research also suggests that actual as well perceived control of pain lessens its impact.

# Annexure C

# Informed Consent

University of Pretoria

Pretoria 0002 Republic of South Africa
http://www.up.ac.za

FACULTY OF HUMANITIES

Dept Biokinetics, Sport and Leisure Sciences
Tel: 012- 420-6040 Fax: 012-420-6099
www.bsl.up.ac.za

## INFORMED CONSENT

I _____
(Full name of prospective participant)

have been informed of the procedures and requirements to participate in a research project with title **"Effect of an Aggressive versus Conservative, Multi-Modal Rehabilitation Programme on Non-Specific Chronic Lower Back Pain".**, to be conducted at the University of Pretoria.

### NATURE AND PURPOSE OF THE STUDY

You are being asked to participate in a scientific research project. The aim of this study is to learn more about the effects of progressive strength training on chronic non-specific low back pain. Research has shown exercise therapy to be effective, and this study will be used to determine how to better use exercise therapy in the treatment of pain and disability symptoms.
Traditional exercise programmes have been found to be effective in the treatment of chronic non-specific low back pain. With this research project, we are hoping to make the exercise programmes more effective.

### EXPLANATION OF PROCEDURES TO FOLLOW

Your participation will involve the completion of questionnaires, muscle endurance testing, and the possible participation in a 12-week rehabilitation programme which will consist of two exercise sessions a week and an educational session once or twice a week. You will be allocated into one of two groups for participation over the 12 week time period. This allocation is random and you are asked to accept your allocation position.
The questionnaires that you will be given to complete will be used to measure the following perceptions:

- the intensity of your own back pain (Visual analog scale)
- how your back pain impacts your activities of daily living (Oswestry disability index)
- the extent to which your back pain influences your activities of daily living (Functional rating index)
- how you perceive that activities like bending would affect your back pain (Fear avoidance beliefs questionnaire) and
- how afraid you are that activities and exercise might further injure your back (Tampa scale of Kinesiophobia).

The physical tests that will be used will consist of the following:

- a straight leg raise test (subject lies on their back and examiner lifts one leg and assess the amount of stiffness in the hamstrings and lower back)

- the Sorenson back extensor endurance test (examiner holds down your legs while the upper body hangs off the edge of an examining table in the face-down position, the upper body has to be kept parallel to the floor without support for the maximum amount of time)
- lower back active range of motion tests (subject is in the standing position, will be asked to bend forward, backwards, to the sides and to twist around, and the examiner will assess the amount of discomfort in the lower back)
- the Slump test (subjects sits off the edge of a table, hands are placed behind the back, chin is placed on the chest and the legs are extended one at a time by the examiner to assess the amount of discomfort in the hamstrings and lower back)
- the side-bridging test (subjects supports themselves on the ground on one forearm and on the feet while in the side lying position, the body is then lifted up and the straightened positions has to be held for as long as possible, and it will be done on both sides) and
- the 60° flexor endurance test (subject will sit on an examining table with the knees bent and the back supported so it forms a 60° angle, after which the support will be removed and the position has to kept for as long as possible).

All of these tests have been selected because they place the least amount of pressure on the back, and are thus comfortable to perform, even though you suffer from low back pain.

After the tests have been completed, you will be allocated into either the conservative or progressive exercise groups.

- The conservative group will be asked to perform exercises that are considered conservative, non-treating and non-exertional by the academic experts. The exercises will be performed two times per week at the Research laboratory at LC de Villiers Sport Centre at the University of Pretoria and it will stay the same for the full 12 weeks of the study. Along with this, if you are allocated to this group you will also receive an information pamphlet that will give information on back safety and risky activities that should be avoided.
- The progressive exercise group will perform exercises that are more difficult than the conservative group exercises, but are still not very exertional in nature. After every 4 weeks, the exercises will be progressed to the next level of difficulty. This will be done for the full 12 weeks of the study. The exercises will be performed 2 times per week at the Research laboratory at LC de Villiers Sport Centre at the University of Pretoria. Along with this, this group will also receive "back school", where for 15 minutes, there will be given an information lecture on aspects of low back pain, for example how to properly bend down to pick objects up from the floor. This group will also receive the information pamphlet that the other group receives. The exercise session and the "back school" session will be an hour in length. The questionnaires and the physical tests will be performed at certain intervals to assess the progress of both groups as they move through the rehabilitation process.

After the 12 weeks, both groups will receive a standard maintenance exercises programme to be performed at home that will be aimed at maintaining the effect of the exercise programmes. This will last for 6 weeks, after which both groups will again be issued with the questionnaires and physical tests to see if the effect has been maintained.

**RISK AND DISCOMFORT INVOLVED**

There might be some slight discomfort involved during the exercise testing and the possibility of slight muscular stiffness afterwards, but this will be minimal and you are asked to willingly accept this possibility. The possibility of injury will be limited as best possible. Medical personnel will be at close proximity to all venues used, and they will be available at all times.
However, there is a large risk involved if you did not seek medical advice about your back in the past, and the back pain is without a diagnosis. This study is only applicable to those suffering from non-specific low back pain, and all other causes have been eliminated. There is a very definite risk of paralysis if something is unknown and you proceed with the exercise programmes. Medical advice is a prerequisite for participation in this study.

**POSSIBLE BENEFITS OF THE STUDY**
Remedial exercise therapy has been successful in the treatment of chronic low back pain. You will be receiving proven treatment methods if you have low back pain. **This type of treatment can become expensive, but you are receiving all of the treatments for free.** The conservative exercise programme has been shown to be successful in the treatment of chronic non-specific low back pain, and is thus a valid tool in the treatment of this type of low back pain. We hope that the progressive exercise programme can be even more successful and effective, and we hope that we can show this with this research project. Both programmes thus have potential as successful treatment methods, so being allocated to either group has no disadvantage. Thus, being in the conservative group is not a disadvantage in anyway, as this type of exercise programme is a recognized, valid and successful means of treatment.

**I FULLY UNDERSTAND THAT I CAN WITHDRAW FROM THE STUDY WITH NO REPRIMANDS OR PUNISHMENTS.**

**HAS THE TRIAL RECEIVED ETHICAL APPROVAL?**
This clinical trial Protocol was submitted to the Faculty of Humanities and the Faculty of Health Sciences Research Ethics Committee, University of Pretoria and written approval has been granted by those committees. The study has been structured in accordance with the Declaration of Helsinki (last update: October 2000), which deals with the recommendations guiding researchers in biomedical research involving human subjects. A copy of the Declaration may be obtained from the investigator should you wish to review it.

**INFORMATION**
If you have any questions concerning this study, you should contact:
Johnny Billson (082 612 0790) - researcher.

**CONFIDENTIALITY**
All records obtained whilst in this study will be regarded as confidential. Results will be published or presented in such a fashion that patients remain unidentifiable.

**CONSENT TO PARTICIPATE IN THIS STUDY.**
I have read or had read to me in a language that I understand the above information before signing this consent form. The content and meaning of this information have been explained to me. I have been given opportunity to ask questions and am satisfied that they have been answered satisfactorily. I understand that if I do not participate it will not alter my management in any way. I hereby volunteer to take part in this study.

I declare hereby that I will not withhold any information that could exclude me from participating in the research project, and I am aware that I am entitled to withdraw from the project at any time if I should wish.

I hereby also grant the researcher permission to use my results for publication and/ or presentation purposes, with my anonymity being ensured.

_____
Signature of prospective participant

_____
Signature of researcher

Tel: _____ (h) _____ (w)

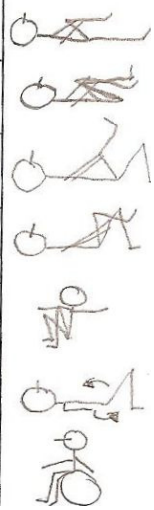
Witness

1. _____

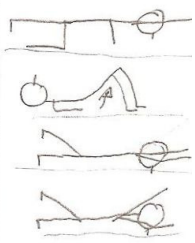
**EXERCISE PROGRAMMES:**

- **Control group exercises:**

| **Exercise** | **Sets** | **Reps** |
|---|---|---|
| Cycling | 5min | |
| Single leg to chest stretch | 2 | 12sec |
| Both legs to chest stretch | 2 | |
| Hamstring stretch (hold back of knee, bend knee slightly) | 2 | 12sec |
| Figure 4 stretch | 2 | 12sec |
| Roll both knees to one side stretch | 2 | 12sec |
| Pelvic tilting | 3 | 10 |
| Sit on stability ball | 3 | 12sec |



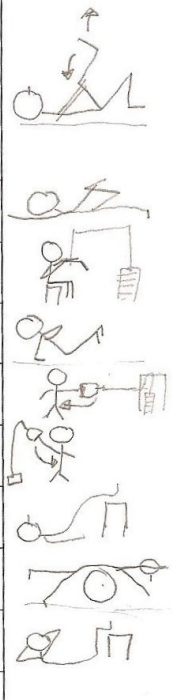
| | | |
|---|---|---|
| Alt superman on all fours | 2 | 4 |
| Hip lifts (feet flat on floor) | 2 | 6 |
| Prone alt leg lifts | 2 | 6 |
| Prone alt arm & leg lifts | 2 | 6 |
| Walking | 10min | |



- **Experimental group exercises:**

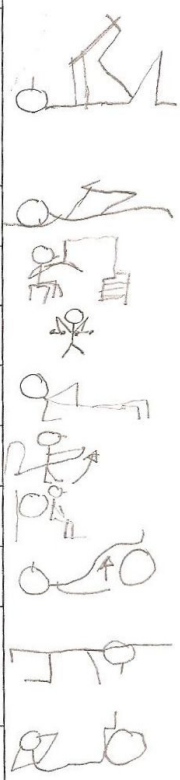
**1st Programme:**

| **Exercise** | **Sets** | **Reps** |
|---|---|---|
| Cycling | 5min | |
| Hamstring stretch (hold leg with both hands, bend leg slightly, perform 20 plantar/dorsiflexion step-offs with extended leg) | 3 | 20 |
| Side lying quadriceps stretch | 3 | 12sec |
| Lat pulldown to front | 3 | 15 |
| Side bridging (on knees) | 3 | 30sec |
| Cable Horizontal adduction | 3 | 15 |
| High cable horizontal adduction (downwards) | 3 | 15 |
| Hip lifts with feet on bench | 3 | 15 |
| Alt superman prone on stability ball | 3 | 12 |
| Abdominal crunches (feet on bench) | 3 | 20 |
| Cycling | 5min | |



**2nd Programme:**

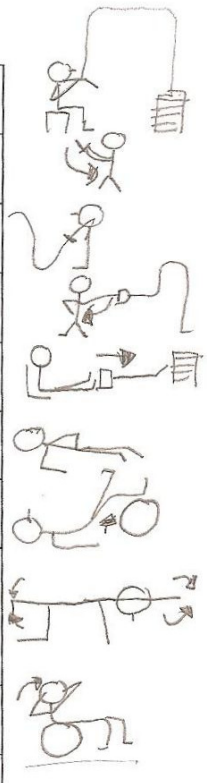
| Exercise | Sets | Reps |
|---|---|---|
| Cycling (2 levels higher) | 5min | |
| Hamstring stretch (hold leg up with towel, stretch for 12sec, 12 plantar/dorsiflexion step offs with leg in extended position, 12sec hold) | 3 | 12;12;12 |
| Side lying quadriceps stretch | 3 | 12sec |
| Lat Pulldown to front | 3 | 15 |
| DB upright row | 3 | 15 |
| Side bridging (on feet) | 3 | 20sec |
| Low cable shoulder extension (straight arm, knees bent) | 3 | 15 |
| Ball squat against wall | 3 | 15 |
| Hip lifts (feet on ball) | 3 | 15 |
| Alt Superman (sweeping hand on floor upon return and up again) | 3 | 12 |
| Abdominal crunches (feet on stability ball) | 3 | 25 |
| Cycling (2 levels higher) | 5min | |



**3rd Programme:**

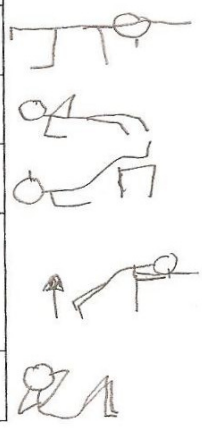
| Exercise | Sets | Reps |
|---|---|---|
| Cycling (increase by 2 levels) | 5min | |
| Hamstring stretch from programme 1 | 2 | 15sec |
| Hamstring stretch from programme 2 | 2 | 15sec |
| Side lying quadriceps stretch | 2 | 15sec |

| | | |
|---|---|---|
| Lat pulldown to front | 3 | 15 |
| High cable pulldown to opposite hip with both arms | 3 | 15 |
| Cable upright row | 3 | 15 |
| Cable lateral raise from front | 3 | 15 |
| Horizontal leg press | 3 | 15 |
| Side bridging (On feet, roll on arms to other side) | 3 | 20sec |
| Hip lifts with one leg at a time (feet on ball) | 3 | 10 |
| Alt superman (hold arm and leg at end range of motion and perform flexion/extension movements with hand and foot) | 3 | 12 |
| Abdominal crunches (lying on ball) | 3 | 30 |
| Cycling for (intensity has to higher than in 2nd programme) | 5min | |



- **Maintenance Programme:**

| **Exercise** | **Sets** | **Reps** |
|---|---|---|
| Alt superman sweep | 3 | 12 |
| Side bridging (On feet) | 3 | 30sec |
| Hip lifts with feet on a chair | 3 | 15 |
| Back extension on kitchen table (lifting both legs at the same time while the upper body is lying on the table) | 3 | 12 |
| Abdominal crunches with feet on floor | 3 | 30 |



# Annexure D

## Case Study Reports

Subject A

Subject B

## Visual Analog Scale (VAS)

Please indicate the amount of pain recently experienced by marking an (X) through the line.

100mm VAS scale – Left hand marker "no pain", right hand marker "extreme pain".

No pain

Extreme Pain

I have experienced this programme to be extremely effective. When I first started, I could even sit or stand without some form of pain, however after the 1st exercise programme I already felt an improvement. After the second programme I had little to no pain. This experience has improved my quality of life, and given me the tools to keep looking after my back. The back school part was extremely informative!

Thank you very much!

## Visual Analog Scale (VAS)

Please indicate the amount of pain recently experienced by marking an (X) through the line.

100mm VAS scale – Left har d marker "no pain", right hand marker "extreme pain".

No pain 9 Extreme Pain

→ Ek het geleer om my postuur te verbeter my pelvis in te druk & my maagspiere sterk te hou.

→ Dit te bestuur is vir my in angeloof likte verbetering en ek hoef nie meer anti-inflamatoriese middels te gebruik op lange rittе.

→ My gemaks-level is baie hoër en ek voel baie beter oor my rug.