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COMPARATIVE REVIEW OF REHABILITATIVE PROFESSIONS ASSISTING PATIENTS WITH LOWER BACK PAIN IN SOUTH AFRICA

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ABSTRACT

Biokinetics is the youngest profession to emerge among the South African rehabilitative fraternity to assist with the management of lower back pain. This discipline is borne out of the philosophy "Exercise is Medicine" and primarily focuses on final phase rehabilitation, applying inter alia cardiorespiratory endurance, range of motion and strengthening exercises. The aim of this communication is to describe some of the views of the profession of Biokinetics, how it may assist patients to manage their lower back pain and its position in the multidisciplinary South African rehabilitative fraternity including: Physiotherapy, Occupational Therapy and Chiropractic Therapy.

***Keywords*:** Lower back pain; Biokinetics; Exercises; Rehabilitation.

INTRODUCTION

Lower back pain *(LBP)* have been negatively impacting the health of mankind since the beginning of antiquity and can be historically traced back to Imphotep (2800 BC) (Castillo & Lieberman, 2015). This painful malady is a common, financially expensive medical condition that have an annual incidence globally of 6.3-15.4% (Hoy *et al.*, 2010). Epidemiological surveillances of *LBP* have identified this condition to be counter-productive, extending beyond the individual's medical status, reaching as far as the country's economy (Hoy *et al.*, 2010). Grabbe *et al.* (2002) and Trinkoff *et al.* (2006) reported that 56% of all sick days among physically stressful occupations is associated with *LBP*, which commonly triggers premature retirement.

Leading South African corporate enterprises have employed biokineticists to evaluate and manage the health status of their employees including the prevalence of *LBP*. Examples of collaborative efforts between corporate enterprises and medical insurers are the medical insurance programmes, such as the Med Benefit and Discovery Vitality assessments, aimed towards health promotion initiatives where the employees, corporate enterprise and medical insurer should all benefit mutually. Personal gain for employees result in improved health conscience, adopting a healthier physically active lifestyle and better nutritional choices, thereby improving their health status and quality of life. The corporate enterprise gains healthier employees that minimise their absenteeism and improves productivity (WEF, 2013). The medical insurers reduce their financial numeration to employees who have sustained hypokinetic diseases due to the improved health status of the employees. The examples of Med Benefit and Discovery Vitality assessments are only applicable to employees of corporate enterprises who are members of these medical insurers. Following these health screening and

risk stratification evaluations, the biokineticists prescribes precautionary and rehabilitative exercise programmes to combat predisposing health risk factors (for both chronic and orthopaedic conditions including *LBP*). South African corporations such as BMW, ABSA bank, First National Bank, SASOL, Mondi Unlimited, have established health and wellness centres at work sites to encourage employees to exercise regularly. These corporations have embraced the salutogenic effect of exercise.

Lower back pain is a symptom of a host of maladies that include inter alia, intervertebral disc compression, cervical postural syndrome, lumbar lordosis, spondylosis, spondylolysis, spondylolisthesis, spondylitis and sciatica (Thiese *et al.,* 2014). Predisposing risk factors include age, poor lifestyle choices, sedentary lifestyle, poor occupational posture and frequent bending and lifting heavy objects (Adedoyin *et al.*, 2005; Yassi & Lockhart, 2013; Ellapen *et al.*, 2014). Cervical posture syndrome and kyphosis have been attributed to poor occupational posture among administrators, which precipitates kypholordotic postures through serial distortion of kinetic chain causing *LBP* (Ellapen *et al.*, 2014). Regular physical activity and exercise is an imperative stressor in the remodelling process, which maintains the strength and integrity of bone mineral density (Amanilori *et al.*, 2015). A sedentary lifestyle negates this fundamental stressor that inevitably results in a reduction of bone mineral density (BMD) leading to osteopenia and osteoporosis (Faghri *et al.,* 2015). A reduction in BMD plays a significant role in the increased risk of fracture and collapsing of vertebrae and formation of hemi-vertebrae (Amanilori *et al.,* 2015). Poor dietary habits and the ageing process are also well known factors for decreasing BMD that increases the risk of collapsed vertebrae and hemi-vertebrae, fractures, stress-fractures and sarcopenia that decreases lumbo-pelvic hip complex (*LPHC)* stability precipitating *LBP* (Figueiredo *et al.*, 2015). The pathomechanics of *LPHC* instability range from innominate bone misalignment, anteriorly tilted pelvis to Trendelenburg gait (Han *et al.*, 2014; Laird *et al.*, 2014). The aforementioned innominate bone misalignment have their aetiology centred on asymmetrical force-couples of the *LPHC*, which can be rehabilitated by corrective stabilisation exercises (Levangie & Norkin, 2011).

In South Africa, many different rehabilitative professions have emerged, assisting society to manage their persistent *LBP*. These professions include Physiotherapy originating in 1924, Chiropractic Therapy in 1939 and Occupational Therapy in 1945 (Quiroga, 1989; Bakewell, 1997). Biokinetics was the latest rehabilitative exercise therapy profession to emerge in 1983 (Strydom, 2005). Physiotherapists, occupational therapists and biokineticists are registered clinicians with the Health Professions Council of South Africa (HPCSA, 2013) and are managed by their respective Boards (BASA, 2016), while the chiropractors are registered with the Allied Health Professions Council of South Africa (AHPCSA, 2016). Moss and Lubbe (2010) reported that there is substantial patient market for the service of biokineticists in South Africa. Biokineticists rehabilitate 6.2-9.1% of the total rehabilitative out care patient population in South Africa, which indicates a positive future for this young profession (Moss & Lubbe, 2010).

Internationally many rehabilitative professions practice alongside each other in a multi-disciplinary medical auxiliary team. In the United States of America, physical therapists (physiotherapists), clinical exercise physiologists and athletic trainers propagate an effective cross-referral multi-disciplinary system of patients among themselves (Ellapen *et al.*, 2017). Similarly in Europe, physical therapists, clinical exercise physiologists and kinesiotherapists

(final phase functional exercise therapists) manage and also cross refer patients to one another. The success of this cross-referral multi-disciplinary system among these rehabilitative professions is based on mutual respect for one another's profession, which is gained through education of the respective scope of practice of the various rehabilitative professions (Ellapen *et al.*, 2017). South African rehabilitative professionals are not adequately educated on the scope of practice of their fellow rehabilitative professionals, which often may lead to encroachment and frustration resulting in unnecessary professional antagonism (Naidoo, 2008; Naidoo & Buhler, 2009; Keyter, 2010; Puckree *et al.*, 2011).

The aim of this presentation is to discuss how the profession of Biokinetics can assist patients suffering from *LBP* and function as a member in a multidisciplinary clinical team following the medical referral chain. Therefore, the basic treatment approach among the different rehabilitative professions will be discussed briefly.

PHYSIOTHERAPY

Physiotherapy can be traced back to ancient China (2500 BC) and later to Hippocrates (460 BC) with the advent of physical treatment, hydrotherapy and massage to relieve pain and discomfort (Quartey, 2016). The profession provide therapeutic services to people whose movement and function are compromised by ageing, injury or disease (Quartey, 2016). The original nomenclature of the profession was *Masseurs and Medical Gymnastics*, which changed to *Massage and Electrotherapy* and finally to *Physiotherapy* in 1942 (Dart, 1961). The initial undertaking of Physiotherapists is an evaluation using clinical tests to identify the injury and its nature. These clinical tests include assessment of joint range of motion, muscle power, strength, tone, endurance, co-ordination, balance and equilibrium, posture, functional ability, gait and locomotor abnormalities, physical fitness tests, cardiac tolerance test, respiratory excursion and exercise tolerance tests, nerve conduction and innervation tests (HPCSA, 2013, Act No. 56 of 1974, Section: Community Care, 2a). The treatment plan involves advice and education for the appropriate selection of wheelchairs, prostheses, aids, appliances, splints, corsets, collars, callipers and supports, prophylactics, injury prevention strategies and posture, recommendation of movement and exercise and other therapies (HPCSA, 2013, Act No. 56 of 1974, Section: Community Care, 2b). Other therapies include:

- Manual treatment that involves the use of hands to manipulate joint alignment, joint mobilisation and massaging;
- Spinal traction and mobilisation;
- Transcutaneous electrical nerve stimulation (TENS) a procedure where an electric current is transmitted to the affected area, with the aim of relieving pain. The therapist apply the TENS to the lengthened antagonist muscle to contract, thereby facilitating the spasm shortened agonist muscle to lengthen. Alternatively the physiotherapist applies the TENS to the elongated strained muscle to increase muscle activity, blood circulation and concentric contraction of the ipsilateral muscle to return to its optimal resting length tension;
- Ultra-sound (US) involves high frequency sound waves delivered to the affected area to treat deep tissue injuries by stimulating blood circulation and cell activity, with the intention of reducing pain and muscle spasms, as well enhancing the healing process.

CHIROPRACTIC

The profession of chiropractic came to South Africa in 1920. In 1928, conflict arose between the South African professions of Physiotherapy and Chiropractic Therapy, concerning the scope of practice of Chiropractic Therapy (Myburgh & Mouton, 2007). The profession of Physiotherapy claimed that the Chiropractic Therapy was encroaching on their scope of practice (Myburgh & Mouton, 2007). In 1971 a bill was passed in parliament that closed the chiropractic register and chiropractic training institutions, thus effectively ending the profession (Keyter, 2010). The Associated Health Service Professions Act No. 63 of 1982, Section: 1.4b was passed into law that enabled the Allied Health Professions Council of South Africa (AHPCSA) to rewrite the profession of Chiropractic Therapy back (Keyter, 2010). In 1989, the former Technikon Natal, now known as the Durban University of Technology offered a diploma in Chiropractics (Myburgh & Mouton, 2007). South African tertiary institutions that offer chiropractic education and training include University of Johannesburg and Durban University of Technology (AHPCSA, 2016). The Allied Health Professions Council of South Africa (AHPCSA) is the present statutory body in South Africa with whom all chiropractors are registered.

Chiropractic is a health profession specialising in the diagnosis, treatment and prevention of mechanical disorders of the musculoskeletal system that effects the functional integrity of the nervous system and general health of the patient. Chiropractic management is the systematic manipulation or adjustment of the joints and/or soft tissue, specifically the vertebrae to normal re-alignment, ensuring correct neural functional integrity. Chiropractors essentially rely upon non-invasive treatment methods and cross-refer patients to pharmacists, medical doctors and surgeons should medication or surgery be required (Keyter, 2010). Chiropractors use their hands to manipulate the spine. Their therapeutic philosophy is that proper alignment of the human musculoskeletal spine, will enable the body to heal itself without surgery or medication (AHPCSA, 2016, Act No 63 of 1982). The chiropractic assessment plan includes an initial screening involving patient history, review of referral letter, clinical manual special tests and diagnostic imagery (X-rays, MRI scans) to identify the injury (AHPCSA, 2016, Act No. 63 of 1982).

The treatment plan of chiropractors includes (AHPCSA, 2016, Act No. 63 of 1982):

- Manual adjustment when the chiropractor manipulates the spinal joint, using controlled sudden, dynamic force to improve alignment, range and quality of motion;
- Electrotherapy;
- Exercise therapy;
- Hydrotherapy;
- Traction therapy;
- Thermal therapy;
- Vibration therapy;
- Immobilisation therapy;
- Neuro-muscular reflex therapy;
- Massage therapy;

- Acupuncture and acupressure therapy (application of dry needling) is a unique therapeutic procedure in which to manage *LBP*, where filiform needles that are commonly applied in acupuncture, are used to deactivate myofascial trigger points.

OCCUPATIONAL THERAPY

The establishment of the South African profession of occupational therapy resulted from the industrious collaborative effort of physiotherapists and post-graduate diplomates of Physical Medicine rehabilitating injured military personnel during World War II (Dart, 1961). This pioneering collaborative rehabilitation made it apparent to the then South African Medical and Dental Council that training medical auxiliary staff as occupational therapists was necessary (Dart, 1961). The University of Witwatersrand was the first South African tertiary institution to offer a diploma in Occupational Therapy (Dart, 1961; OTASA, 2017).

Historically, the lineage of the profession of Occupational Therapy shares a common ancestry with Physiotherapy, which resulted in the adoption of many similar clinical assessments and management. An occupational therapist is a health professional trained to assess and implement treatment to help optimise functional activities for patients with disabling injuries. *LBP* treatment focuses on employing proper body mechanics, promoting the synergistic dominance of larger joints in movement, conserving energy by balancing work and rest, and listening to pain signals to avoid over-exertion (Al-Otaibi, 2015). An occupational therapist examines overall activity index of the patient at home, work and during recreation (HPCSA, 2013, Act No. 56 of 1974). The primary outcome of treatment is to return to work (*RTW*).

The ***assessment plan*** of occupational therapists includes:

a. *History* (including psychosocial factors, pain, functional impairments and occupational impairments) using the Visual Analogue Scale (VAS) and Oswestry Disability Index (ODI) (Van Staden *et al.*, 2011; HPCSA, 2013, Act No. 56 of 1974);
b. *Physical examination* comprising mobility, changing and maintaining posture, moving and handling objects, self-care, carrying, swallowing, attention and memory (AOTA, 2013).

Mobility

- Activities of daily living (interview and observation to determine ability to perform ADL [Activities of Daily Living] and mobility tasks) (AOTA, 2013);
- Modified Barthel Index (an ordinal scale used to measure performance in ADL) (AOTA, 2013);
- Stroke Impact Scale (measures stroke recovery in eight domains: strength, hand function, mobility, ADL, emotion, memory, communication and social participation) (AOTA, 2013).

Changing and maintaining posture

- Assessment of motor and process skills (AMPS) (AOTA, 2013);
- Berg Balance Scale (measures static and dynamic balance, using functional tasks performed in daily living) (AOTA, 2013);
- Performance Oriented Mobility Assessment (POMA) (assesses both static and dynamic balance using tasks testing balance and gait) (AOTA, 2013);

- Timed get up and go test (measures dynamic balance and mobility) (AOTA, 2013).

Carrying, moving and handling objects

- Functional Reach Test (quick simple task dynamic assessment defining functional reach) (AOTA, 2013);
- Action Research Arm Test (assesses ADL, coordination, dexterity, upper extremity function) (AOTA, 2013);
- Arm Motor Ability Test (AOTA, 2013).

Self-care

- Wolf Motor Function Test (AOTA, 2013);
- Cleveland Scale of ADL (AOTA, 2013);
- Patient-specific functional scale (AOTA, 2013);
- Functional Assessment Scale (AOTA, 2013);
- Performance Assessment self-care skills (AOTA, 2013);
- AM-PAC (Activity Measure for Post-Acute Care) Daily Activity (AOTA, 2013).

Swallowing

- Mann Assessment Swallowing Ability (AOTA, 2013);
- Acute stroke dysphagia screen (AOTA, 2013);
- Victorian dysphagia screen (AOTA, 2013);
- Swallowing ability and function evaluation (AOTA, 2013).

Attention

- Test for everyday attention (AOTA, 2013);
- Short blessed test (AOTA, 2013);
- Neurobehavioral cognitive status screening examination (AOTA, 2013);
- D2 Test of Attention (AOTA, 2013).

Memory

- Contextual memory test (AOTA, 2013);
- Rivermead Behavioral Memory Test (AOTA, 2013);
- AM-PAC: Applied cognitive (AOTA, 2013);
- Diagnostic testing and imagery (X-Rays and MRI Scans).

The ***treatment modalities*** of occupational therapists include (HPCSA, 2013, Act 56 of 1974):

a. Return to work advice, work restriction, ergonomic interventions and work hardening programmes;

b. Lumbar support, back schools (educates patients to self-manage their lower back pain, by adopting better ergonomic posture at work, during leisure activities and rest (teaches the person to listen to the body, identify pain and apply proper lifting techniques of objects) (HPCSA, 2013, Act 56 of 1974).

BIOKINETICS

Biokinetics is concerned with improving the physical and health status and quality of life of an individual through individualised assessment and exercise prescription (HPCSA, 2013, Act No. 56 of 1974, Section: 1). The profession is born out of the philosophy "*Exercise is Medicine*". The therapeutic approach of Biokinetics can be summarised by the statement of Moses Maimonides, the Jewish philosopher-physician sentiments about the salutogenic effect of exercise on health, namely "Anyone who lives a sedentary life and does not exercise, even if he eats good food and takes care of himself according to proper medical principles, all his days will be painful ones and his strength shall wane" (Ryan, 1984:124).

The primary variation between Biokinetics and the aforementioned therapies concerning *LBP* is its' sole application of exercise as a therapeutic modality (final phase rehabilitation) (HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2ii). Acute symptomatic treatment involves inter alia pharmaceutical medication (pharmacist and doctors), acute phase spinal and *LPHC* mobilisation and manipulation (physiotherapist), and/or invasive surgery (surgeons) and post-surgical acute treatment range of motion exercises (physiotherapists) (Brukner & Khan, 2008; HPCSA, 2013, Act No. 56 of 1974; AHPCSA, 2016, Act No. 63 of 1982). Post-surgery treatment range of motion exercise are usually prescribed by a physiotherapist and a biokineticist (HPCSA, 2013, Act No. 56 of 1974, Section: Community Care: 2b; HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2 (ii)). Treatment exercises involves restoration of normal multi-planar joint range of motion and basic core strengthening exercises focusing on intrinsic inter-vertebral segment stabilisation. *LBP* can be attributed to instability albeit in one or all three planes of movement (Prentice, 2011). Therefore physiotherapists and biokineticists prescribe exercises in all three planes of movements to ensure the strengthening of transverse spinal muscles (multifidus, rotators, interspinales and intertransversarii).

Biokineticists also provide progression of exercise from simple to complex and finally to functional movements, as well as the stimulation of small local to larger global torque generating musculature of the core (Van Staden *et al*., 2011; HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2ii). Strengthening exercises progression involves increasing repetitions, sets, resistance and graduation from stable to unstable surfaces. Biokineticists provide a more comprehensive exercise prescription plan that includes warm-up, stretching, strengthening, proprioception and cool-down, which are generally not prescribed by other professions (Van Staden *et al*., 2011). The variation in exercise prescription between physiotherapists and biokineticists is illustrated in the comprehensive multi-disciplinary plan of Van Staden *et al*. (2011), where biokineticists prescribe exercises to the larger global muscles trained in a gymnasium and the improvement of cardiorespiratory endurance, while physiotherapists prescribe the strengthening of small, local muscles. Scope of practice both professions enable them to prescribe exercises to small local, larger global muscle activation, as well as cardiorespiratory endurance. This is an overlap in these professions scope of practice

(HPCSA, 2013, Act no. 56 of 1974, Section: Community Care: 2b; HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2 (ii)).

Final phase rehabilitation exercises are prescribed by biokineticists when the patient has range of motion in the frontal, sagittal and transverse planes. However, range of motion of the patient may be limited, thereby constraining their daily activity, requiring additional stretching exercises to enhance joint flexibility and muscle extensibility. In such scenarios, the biokineticist will apply controlled proprioceptive neuromuscular facilitation stretching techniques to progressively relax the spasmed muscle, returning it to its normal optimal resting length tension (Prentice, 2011). In addition to range of motion exercises, core strengthening exercises are also prescribed and modulated by frequency, intensity and repetitions. The intention with the strengthening exercises is to increase muscle tensile strength and contractility and endurance to hold the vertebrae in optimal alignment preventing intervertebral disc compression and misalignment (Prentice, 2011). The prescription and execution of these final phase rehabilitative exercises help to diminish the probability of relapsed *LBP* (Brukner & Khan, 2008). Cardiorespiratory endurance training also triggers endorphins, serotonin and dopamine which may change the perception of *LBP* (Arazi *et al.,* 2016). Appropriate cardiorespiratory endurance training increases heart rate and energy expenditure, producing fat mass lost. Prentice (2011) reported that excessive abdominal fat mass is a significant contributor of *LBP*, which must be reduced. There are scenarios where the patient is lean, however, the compliance to cardiorespiratory exercise is advisable to enhance or maintain their cardiorespiratory endurance and not fat mass reduction.

Final phase rehabilitation stabilisation exercise deals with the re-establishment of abnormal force-couples relationship in the sagittal, frontal and transverse planes to normality (Prentice, 2011). The final phase therapeutic goal is to increase force-closure leading to enhanced form-closure and thereby stabilising the *LPHC* (Arumugam *et al.,* 2012). If biomechanical inconsistencies prevail, reciprocal inhibition of weaken, elongated muscles will continue facilitating synergistic dominance that cannot be addressed by treatment exercises alone (Prentice, 2011). The supplementation of stretching muscle contractures into a new plastic range and strengthening weak and elongated muscles, addresses *LPHC* abnormal-force couples, returning them to normal length-tension relationship and subsequently dissipating pain and disability (Prentice, 2011; Arumugam *et al.,* 2012). A biokineticist employs a variety of stretching and strengthening exercise techniques to stabilise *LPHC*. Kamal (2015) provide scientific evidence for the endorsement of *LPHC* stabilisation exercises that has the primary focus of conservative treatment and rehabilitation. Biokineticists reviews the patient's *LPHC* arthokinematics to attain optimal skeletal alignment and joint range of motion in motor co-ordination.

The ***rehabilitative plan*** that biokineticists adopt when rehabilitating *LBP*, includes *inter alia* the following:

a. The patient undergoes a biokinetic evaluation, which includes a medical history and reviewing referral letters from physiotherapists, occupational therapists, general practitioners and surgeons (Brukner & Khan, 2008; Prentice, 2011; HPCSA, 2013, Act No. 56 of 1974, Section: Evaluation: 1a).
b. Assessing *LPHC* arthokinematics involves passive and active muscle extensibility, muscle strength (manual, resisted and isokinetic), biomechanical gait analysis, postural analysis,

and evaluation of muscles in the roles of agonist, antagonist, synergist, stabiliser and neutraliser in the sagittal, frontal and transverse planes (special manual muscle tests). Assessment of *LPHC* arthrokinematics includes pelvic-to-femur flexion (long and short arcs), femur-to-pelvic flexion (single and both legs), pelvis-to-femur extension (long and short arcs), femur-to-pelvis extension (single and double legs) and internal and external pelvis-to-femur rotation (long and short arcs) and internal and external femur-to-pelvis rotation (long and short arcs). From these assessments, the biokineticist can then identify synergistic dominance of muscles (Brukner & Khan, 2008; Prentice, 2011; HPCSA, 2013, Act No. 56 of 1974, Section: Evaluation: 2b (iii)).

c. The aforementioned information will be used to prescribe an individualised final phase rehabilitation programme. The programme will entail a warm-up and cardiorespiratory component according to individualised heart rate and fitness status, range of motion exercises (different techniques to ensure restoration of optimal length-tension relationship), strengthening exercises using different muscle contractions (isometric, isotonic and/or isokinetic), proprioception and functional activities. Proprioception exercises are essential to rehabilitate neuromuscular facilitation and prevent neuromuscular inhibition. Functional activities vary depending on the physical status of the patient ranging from sit-to-stand among the elderly to functional drills for sport among athletes (Brukner & Khan, 2008; Prentice, 2011; HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2 (ii)).

Grey areas in the management of *LBP* are appreciated, which overlaps between the pathogenic and the fortogenic paradigms in the treatment regime (Strydom *et al.*, 2009; Hall, 2013). Hall (2013) reported an overlap in the scope of practice among physiotherapy and biokineticists during post-surgical and/or medical rehabilitation (final phase) and primary and secondary injury prevention. Overlaps in the primary and secondary injury prevention clinical assessments include fitness, endurance and exercise tolerance, physical work capacity tests and therapeutic exercise (Hall, 2013). Clinicians should be mindful and appreciative of each other's scope and therapeutic input to the well-being of the *LBP* patients. South African rehabilitative professionals are not adequately educated on the scope of practice of their fellow rehabilitative professionals, which leads to lack of mutual professional respect, communication, encroachment of scope of each other practice and frustration, as well as professional antagonism (Naidoo, 2008; Naidoo & Buhler, 2009; Keyter, 2010; Puckree *et al.*, 2011).

There is overlap in the scope of practice with regard to the prescription of *LPHC* final phase rehabilitative exercises between the physiotherapists and biokineticists (HPCSA, 2013, Act No. 56 of 1974, Section: Community Care: 2b; HPCSA, 2013, Act No. 56 of 1974, Section: Final phase rehabilitation: 2 (ii)). Occupational therapists only perform final phase occupational rehabilitation (HPCSA, 2013, Act No. 56 of 1974).

Table 1*. COMPREHENSIVE MULTI-DISCIPLINARY REHABILITATIVE TEAM PLAN TO MANAGE *LBP

Intervals	Doctors & nurses	Occupational therapy	Physiotherapy	Biokinetics
Within one week pre-surgery	Nurse performs VAS & ODI.	No intervention.	No intervention.	No intervention.
During hospital stay	Surgery & daily ward rounds.	Provision of back care & demonstration of principles applying to activities of daily living.	Mobility training regarding turning in bed, getting into & out of bed, walking. * Basic ROM exercises (if possible).	No intervention.
Week 3	No intervention.	VAS & ODI assessment to identify problems relating to pain management and adherence to back care principles. Address questions & fear of movement. Advise on the use of cushions on chair.	Exercise and stretching progress. Treatment of muscle spasms using various modalities.	No intervention.
Week 6	Follow-up with X-Rays.	Follow-up from previous visit (VAS & ODI).	Follow-up from previous visit.	No intervention. (The lack of final phase rehabilitation in Van Staden *et al.* (2011) plan is a concern. Final phase rehabilitation is important to help patients return to daily functional activities after their *LBP* and thereafter progress to RTW occupational therapy. The following expertise of biokineticists to be included at this stage of rehabilitation is recommended): * Arthrokinematic *LPHC*, core, cardio-respiratory & kinanthropometry assessments.

Continued

Intervals	Doctors & nurses	Occupational therapy	Physiotherapy	Biokinetics
Week 6 (*cont.*)				* Start final phase functional rehabilitation, using multi-planar exercises and activities. * Start light cardiorespiratory endurance training.
Week 12 Daily intervention for 5 days	Follow-up with X-Rays.	VAS & ODI assessments. Begin work hardening intervention, including practise posture during simulated work tasks. Add life skills, work ethics & anatomy of back in group discussions. Contact employer to recommend reasonable accommodations.	Adaptation of exercises with biokineticist in gymnasium. Adaptation of exercises with biokineticist can be prescribed without assistance of physiotherapist as it is in their scope of practice.	Focus on endurance using treadmill & power plate * Progression of final phase functional multi-planar exercises. No power plate. * Progression of cardiorespiratory endurance with intention to reduce abdominal fat if applicable.
Week 16 RTW	Follow-up regarding RTW.	VAS & ODI assessment. Work visit to ensure recommendations of reasonable accommodation are implemented. Advise patient & employer on-site.	Follow-up general physical fitness.	No intervention. * Assess core strength & endurance, arthokinematics of *LPHC.* * Progress patient to the gym to exercise larger global torque generating core muscles.
Week 24	Follow-up with X-Rays.	VAS & ODI assessment.	Follow-up general physical fitness.	No intervention. * Arthokinematics *LPHC*, core, cardio-respiratory and kinanthropometry assessments.

* Indicates the modification to the comprehensive multi-disciplinary rehabilitative team plan to manage *LBP* of Van Staden *et al*. (2011:72).
LBP= Lower Back Pain *VAS*= Visual Analogue Scale *ODI*= Oswestry Disability Index *LPHC*= Lumbo-Pelvic Hip Complex

Van Staden *et al.* (2011) proposed a comprehensive multidisciplinary rehabilitative team plan to manage *LBP* (Table 1). However, there is no final phase functional rehabilitation included in the plan, which is important to assist the patient to return to daily functional activities without *LBP* and thereafter progress to *RTW* occupational therapy rehabilitation. It is proposed that biokinetic intervention should begin at week six of the plan to increase muscle strength and endurance using final phase functional rehabilitation exercises and activities that require multi-planar movements. This will provide the patient with adequate muscle strength and endurance of their local smaller transverso-spinal and larger core muscles of the *LPHC*, which will increase the patient's confidence when they begin the *RTW* occupational therapy in week 12 (this is absent in the plan). The patient needs to initially increase functional muscle strength and endurance of the *LPHC* and thereafter increase their cardiorespiratory endurance.

SUMMARY

Lower back pain is one of the conditions that can be successfully treated and managed by the different rehabilitative professions in South Africa, the latest being Biokinetics. The distinction of Biokinetics from Physiotherapy, Chiropractor Therapy and Occupational Therapy is the sole application of exercise as a therapeutic modality in final phase functional rehabilitation and no involvement in the initial acute treatment. It is hoped that this clinical review of the approaches of the various therapeutic professions may contribute to the mutual appreciation of the different disciplines in the multidisciplinary team, build mutual professional respect and prevent trespassing on the scope of practice of others.

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