

The Purpose of Spinal Rehabilitation: Integration of Passive and Active Care

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The purpose of spinal rehabilitation is to prescribe effective therapeutic exercise. This is indicated for individuals who have developed physical deconditioning of their muscular systems. This may have arisen from a specific injury; from functional loss associated with degenerative processes; from disuse; fear avoidance behavior; or pain inhibition.

Several key concepts are fundamental to this therapeutic approach. Muscle weakness or, more specifically, decreased endurance or motor control around a specific joint axis, is an essential feature of chronic musculoskeletal pain (MP). Chronic MP is basically a motor control problem and cannot be clearly identified by diagnostic studies. In some cases, pathoanatomy is well correlated with a clinical symptom complex and orthopedic or neurologic testing. While surgery is sometimes appropriate in such cases, the majority of the time soft tissue or MP does not require surgery. Nonetheless, the locomotor system is not functioning appropriately and perpetuation of MP and repetitive strain naturally ensue. Thus, a rehabilitation program aimed at improving motor control-muscular endurance/coordination of joint stabilizers is justified.

The basic starting point of therapeutic exercise is an assessment for abnormal function (strength, endurance, coordination, balance, flexibility). Whenever possible, a quantifiable functional deficit yielding a percentage below normal should be determined as a baseline from which to determine progress. Next, an effective training program should be administered which isolates the "weak link" and provides the appropriate mode, intensity, frequency and duration of exercise to improve function. Such training should occur in such a way as to maximally challenge the muscle system while minimizing strain on the osteoligamentous structures which are the primary pain generators.

Such training occurs in what is called the functional training range (FTR). The FTR is defined as the range which is both painless (or centralizing) and appropriate for the task at hand. To achieve this goal, no specialized equipment is necessary; however, knowledge and skill about how to identify poor motor control and train a patient's stabilization mechanisms are necessary.

A chiropractic rehabilitation specialist (CRS) knows how to improve muscular endurance, coordination, balance, strength and flexibility through therapeutic exercise with simple techniques requiring minimal expense in equipment or space. A CRS can coach patients and knows when to refer to other rehabilitation specialists for more intensive training, multidisciplinary rehabilitation, or work hardening programs. As muscle and joint function improves pain is expected to diminish. If this does not occur, the patient requires re-evaluation to rule out "red flags" of serious disease, relevant pathoanatomy or "yellow flags" of abnormal illness behavior.

Chiropractic adjustments can achieve short-term relief of pain, but they cannot sufficiently influence the muscle system to improve motor control in chronic cases. For instance, atrophy of the multifidus

has been found to occur in acute low back pain patients exactly where joint mobility restrictions and pain are found.

Relief of pain does not restore muscle mass to the multifidus: only a carefully executed spinal stabilization routine can achieve that. Patients can be motivated to participate in spinal rehabilitation programs by their desire to both improve function and relieve pain. This motivation will enable them to learn to tolerate some pain during the rehab process and learn to distinguish between hurt and harm. The rehabilitation program is successful because it follows modern physiological principles of tissue repair, endurance training, muscular hypertrophy and neural control.

Getting Reimbursed

Most third-party payors have experienced ongoing treatment for chronic MP without any realistic endpoints of care. There are no objective tests from which to determine the need for appropriate care or the conclusion of it. Typical treatment includes passive modalities such as electrical muscle stimulation, ultrasound, massage, traction, etc. Other treatments such as manipulation and exercise are frequently employed. Based on this experience, most insurance companies are wary of reimbursing for long-term palliative measures.

However, there is a sound rationale for spinal rehabilitation in chronic MP. Whereas palliative measures, in particular spinal manipulation, give much needed symptomatic relief and improved activity tolerance in acute pain patients, it is exercise which is proven to be effective in chronic situations. The critical juncture in MP where rehabilitative (active care) rather than palliative measures (passive care) are most important is after six weeks. At this point, the likelihood of recovery drops dramatically and both physical and psychological deconditioning become the main factors responsible for perpetuation of MP.

Physical deconditioning can be measured by reliable, quantitative tests such as Sorensen's back extensor test. Psychological deconditioning can also be identified with very good reliability by using simple questionnaires. A rational approach to resolving deconditioning begins with a simple rehabilitation program aimed at the key motor control deficits. If unsuccessful, multidisciplinary approaches utilizing a biobehavioral approach are necessary.

To institute a spinal rehabilitation program for subacute or chronic MP, training in the patient's FTR is necessary. This ensures that the likelihood of injury exacerbation and deconditioning is minimized. In the presence of prolonged activity restrictions, injured tissues further deteriorate as the nervous system establishes substitution mechanisms to perform basic activities.

Unfortunately, palliative care approaches utilizing passive care modalities usually fail to rehabilitate these abnormal substitution patterns. Thus, the patient either transitions to chronic pain or has recurrences of their acute pain in the near future. Even many exercise programs which focus only on strengthening and ignore coordination may inadvertently reinforce the substitution mechanisms by training "trick" movements. Such "trick" movements recruit overactive synergists and don't train appropriate proximal joint stabilizers during dynamic exercises such as on isotonic machines. If the quality of the movement pattern is not maintained during progressive resistance training (PRE), then such substitution patterns are only reinforced providing no therapeutic gain to the patient.

One solution is to utilize simple exercises within the patient's FTR. If the key spinal stabilizers are activated, such as transverse abdominus and multifidus, and trained for endurance utilizing sustained

holds (10s) of multiple repetitions (10r) of submaximal loads (40% MVC), then a therapeutic result can be expected (Twomney, Richardson). This requires no expensive equipment at all (floor space, gym balls). If isotonic machine based exercises are performed, endurance training (submaximal) should precede strength training (Manniche). Moderately priced isotonic machines can be used to enhance this approach (\$10-25,000). More expensive equipment such as MedX or Isostation B200 computerized muscle testing and training devices may also be utilized (>\$50,000).

Muscle training should start off by staying in the FTR, isolating stabilizers, avoiding perpetuating substitution patterns, maximally challenging target muscles while minimally loading joints, using submaximal loads, training at slow speeds or even isometrically, and training endurance. Training should progress to full-range movements using near threshold loads, faster speeds, isotonic movements and training strength. Most importantly, training should progress to include movements which are as similar as possible to the activities the individual performs in their daily life. This is because the training benefits are specific to the movement, speed and position used in training. This is the principle of specific adaptation to imposed demands (SAID). It should guide all therapeutic exercise prescriptions.

Billing Codes to Use:

Assessment	Code	Billing
Muscle Testing/Strength	97720	\$50.00
Range of Motion	95831	\$40.00
Activities of Daily Living Inventory	97700	\$60.00
Treatment		
Therapeutic Exercise	97110	\$40.00
Neuromuscular Re-education	97112	\$40.00
Functional Activities	97114	\$40.00
Therapeutic Activities	97530	\$50.00

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