

## Proximal Tendon, Distal Muscle; Proximal Muscle, Distal Tendon

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The concept expressed in the title means that a hypertonic (overly contracted) muscle will shorten. In so doing, there will be a pull or tug at the origin and insertion points of the muscle: tendons. Sustained pulling of tendons can result in tendon irritation or inflammation, either proximally or distally.

Examples of this concept can apply to muscles associated with spinal, occipital and pelvic attachments. For example, consider the following muscles:

1. *levator scapula*
2. sternocleidomastoid
3. *trapezius*
4. rhomboids

Each of these muscles has spinal attachments. At this point, the concept enlarges. Dr. Irvin Korr spoke of the concept of "segmental facilitation." Dr. Korr was a physiologist whose work involved the relationship of muscles to their spinal attachments. The results of his experiments showed that muscles attached to dysfunctional spinal vertebrae underwent changes in irritability and contractility, becoming more irritable and contracted. Thus, spinal fixation can cause shortening of attached muscles, causing symptoms in those muscles and their tendonous attachments, proximally or distally.

The levator scapula is a great example of this concept. It attaches to the first four vertebrae of the cervical spine and the upper medial scapula. Levator pain is a common finding in chiropractic practice. It is commonly related to occiput/C-1, C-1/C-2 and C-2/C-3 dysfunctions. Practicing doctors everywhere must have witnessed the frequent disappearance of levator symptoms with upper cervical adjusting. If, however, the problem of levator irritation has gone on too long, the levator may need more direct treatment to reduce muscular contraction and irritation/inflammation at the tendonous attachments. For example, the levator may have to be treated with electrotherapy, massage and ultrasound. Stretching may also be required.

Interestingly, problems with the infraspinatus muscle may accompany this hypertonic contraction of the levator scapula muscle. The infraspinatus also commonly presents with hypertonic status, requiring softening techniques to reduce muscle shortening. Trigger points with this hypertonic muscle can create a variety of symptoms, such as shoulder pain, shoulder stiffness/decreased ROM in several directions (especially lateral abduction and medial adduction), anterior shoulder pain, cervical pain, and arm and wrist pain.

Other common muscle reactions accompany AS ilium fixations. These reactions involve hypertonic and overly contracted muscles, causing muscle and associated tendon complaints. Examples of these are: gluteal muscles (hip extensors), hip flexors (especially the *rectus femoris*, TFL, and *gracilis*), and

hamstrings.

The mechanisms of muscular hypertonicity with these muscles are different than with the muscles with spinal attachments. With these pelvis-attached muscles, the mechanism appears to reflect overuse: The muscle gets overused and begins to resist overusage by contracting. When the ilium does not rotate posteriorly during hip flexion (e.g., walking, running), a sequela of events occurs:

1. Gluteals become overstretched, due to increased hip motion at the acetabulum. Eventually, complaints may develop in these gluteal tissues, in the muscle fibers or at the tendonous attachments on the ilium, sacrum or femur. Release of the muscular contraction through AS ilium correction, muscle massage, ultrasound or stretching will eliminate the complaints.
2. Hip crepitus can occur, due to increased compensatory femur head activity, leading to irritation/inflammation and increased wear of the hip joint. This irritation can spread to the tendonous attachments at the femur head, or a facilitation process of gluteal muscles may be involved.
3. Hip flexors develop hypertonicity, because their antagonists (the hip extensors, or gluteal muscles) have become shortened and resistant to relaxation during hip flexion. The common complaints seen here are:
  1. anterior thigh pain, associated with rectus femoris strain;
  2. anterior/medial thigh pain, associated with gracilis strain;
  3. lateral pelvic pain, superior to the femur head, associated with the TFL;
  4. lateral thigh complaints, associated with the TFL;
  5. groin complaints, associated with the tendonous attachments of the rectus femoris and gracilis;
  6. lateral knee complaints, associated with the TFL muscle tendon strain;
  7. anterior knee compartment disorders, associated with strain of the tendonous extension of the rectus femoris;
  8. hamstring strain, due to continued overstretch of the hamstring (due to the loss of posterior pelvic rotation);
  9. ischial and posterior knee and upper calf complaints, as a result of overstretch and strain at the tendonous attachments of the hamstring muscles at the ischial tuberosity and posterior knee region (and upper leg); and
  10. medial knee complaints, associated with the gracilis and sartorius tendonous attachments.

The concept of treatment with pelvis-attached dysfunctional muscles involves the following processes:

1. release of the AS ilium fixation, which may be due to:
  1. a real SI joint fixation;
  2. a compensatory pseudo-fixation, reacting as a result of spinal dysfunctions, lumbar hyperlordosis, or thoracic hyperkyphosis (Spinal dysfunctions creating the AS fixation can be anywhere, but common areas are the T/L region, mid-thoracic region, and upper cervical region.);
  3. lower extremity disorder;
  4. lumbar disc disorder; or
  5. cervical or thoracic disc disorder;
2. release of the tension and contraction in the muscles. For this, you may use any combination of:
  1. electrotherapy;

2. massage techniques;
3. ultrasound applied to muscles, not tendons; and
4. stretching (using caution not to irritate tendons at early stages).

The electrotherapy can be divided into two different types of application:

1. Millicurrent, such as any standard contractile current, can be used to soften muscle regions and sedate sore tissues. Strong millicurrent contractile current is applied to hypertonic muscles, not tendons.
2. Microcurrent (or low intensity millicurrent, if microcurrent is not available.) can be applied to tendons and joints. Use:
  1. positive polarity to reduce any inflammation; or
  2. alternating positive and negative polarity to induce healing.

Microcurrent is less overwhelming to injured joint tissues and tendons and has a great capacity to induce or quick-start tissues in the repair process. Repair appears to occur as a direct result of the current at the cellular level, as opposed to indirect effects of the millicurrent. If millicurrent is used on irritated tendons or joint regions, I have seen the best results with low intensity, which does not aggravate the sensitized tissues. When millicurrent is applied to muscle that is overly contracted, I try to induce some level of muscular contraction to loosen the contraction.

Medium-frequency (Russian) current is used by some to specifically soften tissues. Associated with long-term hypertonic tissues is the development of adhesions. These adhesions, within muscles, can be a continued source of irritation, but can be reduced with electrotherapy and massage techniques.

In each case presented in this article, I have tried to show interrelationships of spinal or pelvis-attached muscles and spinal/pelvic dysfunctions. I call these muscular/tendonous conditions "associated disorders." In my experience, the difficulties in solving associated disorder complaints fall into three categories:

Acute care: This is the process of correcting the spinal/pelvic dysfunctions and treating the involved tissues to reduce and eliminate the complaints.

Maintenance of the corrections: For example, consider a person with a hyperkyphotic thoracic spine and an associated hyperlordotic spine, leading to AS ilium fixations and shortened hamstrings. Ischial tuberosity tendon attachment irritation of the biceps femoris muscle will be associated with shortened hamstrings. The irritation to the tendon may be slight or may involve a significant tear or avulsion. The process of repair may take a short time - or longer - with significant injury. Following the protocol given can more easily relieve complaints. However, maintenance of those corrections and repairs also can make or break the process. Releasing the patient too soon can result in failure and frustration. Not evaluating the degree of tissue injury and underestimating repair time can result in failure, and not communicating these facts and concepts to the patient can lead to patient frustration and resignation from treatment.

Rehabilitation: If muscles or tendonous tissues have been significantly injured, cautious rehabilitation must be considered. Let me give you an example: I treated a middle-age woman who presented with

right "ischial bursitis." She had been sitting with legs outstretched on the floor and heard a snap at the ischial region, followed by pain and limitation of right hip flexion. She had bilateral AS ilium fixations, a hyperlordotic lumbar spine, moderate thoracic kyphosis, and T/L extension fixations. I corrected the AS ilium on the right side by adjusting the T/L region and providing a direct right AS ilium fixation adjustment. Contractile current, massage, and ultrasound were applied to the biceps femoris, and a (+) microcurrent was applied to the ischial tuberosity. She received great and almost total relief immediately.

The patient followed up a few times for more treatment. After the third treatment, she decided to take a 30-minute walk and exacerbated the condition. I saw her again and told her that we would have to take smaller steps and that much more time would be required. I should have understood from the start that we were dealing with a more serious disorder, due to her history of hearing and feeling a "snap." I should have prepared the patient for a more lengthy and cautious approach. She had previously seen an orthopedist and physical therapist. The PT had given her stretching exercises too soon, which had exacerbated the pain. The patient's patience had been previously exhausted and underevaluated. In this case, a realistic explanation and plan should have been developed and communicated before undertaking rehabilitation.

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