Musculoskeletal injuries are the leading cause of disability in the United States. Chronic tendon injuries sideline many individuals. Today, managed care forces most therapy centers to complete treatment for a tendon injury in six to eight visits. Review of the medical literature reveals that individuals with chronic tendon injuries must reach 80–90% of contralateral strength before returning to preinjury level of activity, whether that is returning to a competitive sport or to factory work, or the symptoms will return. How can this be accomplished? This article clarifies symptoms of chronic tendon injuries and presents an appropriate treatment protocol.

**Diagnose Correctly**

Review of medical articles and athletic training textbooks indicates that the first step required when describing a chronic tendon injury is to use the correct terminology. The main symptom of many chronic tendon injuries greatly differs from the main symptom in acute (symptoms present <6 weeks) tendon injuries. By missing this important point, the treatment protocol for chronic tendon injuries might fail to focus on the main symptoms, causing patients to fail to reach maximal benefits within the tight time constraints imposed by managed care.

Traditionally, *tendinitis* has referred to all painful conditions involving the tendon. The suffix *-itis* means inflammation, the most prevalent symptom in acute tendon injuries. Chronic tendon injuries more often show symptoms of degeneration and atrophy, with little or no sign of inflammation, so the term *tendinosis* more accurately describes them; the correct focus for treatment of most chronic tendon injuries is restoring function, not controlling inflammation.

The classification of tendon injuries consists of three overlapping pathologies: inflammation, degeneration, and rupture (see Table 1). The terms *paratendinitis* and *tendinitis* describe a predominance of inflammation, whereas *tendinosis* describes atrophy caused by tissue degeneration. These terms are seen frequently in the literature, but the treatment protocols mainly focus on decreasing inflammation. Arnheim and Prentice (1993) provide the following management recommendations for chronic Achilles tendon injury:

- Ice
- Gentle stretching
- Nonsteroidal anti-inflammatory drugs (NSAIDs)
- Rest
- For runners, reducing distance, avoiding hills and uneven surfaces
- Footwear and orthotic management
- Surgery to excise nodules

This protocol emphasizes treating inflammation with ice, NSAIDs, and rest. Correction of intrinsic problems of the lower extremity is addressed with shoe and orthotic changes. Chronic conditions degenerate the tendon (tendinosis), with few inflammatory cells.
present. Eccentric exercise is needed to reverse the degeneration of the Achilles tendon, but this is not mentioned in most textbooks.

Some authors (Klaiman & Shrader, 1996; Nirschl, 1992; O'Connor, Sobel, & Nirschl, 1992) present PRICEMM as an acronym for treating chronic tendon injuries:

- **P**—protection
- **R**—relative rest
- **I**—ice
- **C**—compression
- **E**—elevation
- **M**—modalities
- **M**—medication

This acronym provides excellent guidance in controlling pain and inflammation, but again, many chronic injuries have little or no inflammation. Spending the majority of visits treating inflammation with this acronym as a guide could fail to strengthen the involved musculotendinous unit to the 80–90% required. These patients often relapse on returning to sport or work.

Chronic injuries might not be effectively treated using the PRICEMM acronym. Instead, a new acronym is needed:

- **R**—relative rest
- **M**—modalities
- **C**—control abuse
- **E**—exercise

**Table 1. Terminology of Tendon Injury**

<table>
<thead>
<tr>
<th>New</th>
<th>Old</th>
<th>Definition</th>
<th>Histologic Findings</th>
<th>Clinical Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paratenonitis</td>
<td>Tenosynovitis</td>
<td>An inflammation of only the paratenon, either lined by synovium or not</td>
<td>Inflammatory cells in paratenon or peritendinous areolar tissue.</td>
<td>Cardinal inflammatory signs: swelling, pain, crepitation, local tenderness, warmth, dysfunction.</td>
</tr>
<tr>
<td>Paratenonitis</td>
<td>Tendinitis with tendinosis</td>
<td>Paratenon inflammation associated with intratendinous degeneration</td>
<td>Same as above, with loss of tendon collagen, fiber disorientation, scattered vascular ingrowth, but no prominent intratendinous inflammation.</td>
<td>Same as above, often with palpable tendon nodule, swelling, and inflammatory signs.</td>
</tr>
<tr>
<td>Tendinosis</td>
<td>Tendinitis</td>
<td>Intratendinous degeneration caused by atrophy (aging, microtrauma, vascular compromise, etc.)</td>
<td>Noninflammatory intratendinous collagen degeneration with fiber disorientation, hypocellularity, scattered vascular ingrowth, occasional local necrosis or calcification.</td>
<td>Often palpable tendon nodule that can be asymptomatic but might also be point tender. Swelling of tendon sheath is absent.</td>
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<tr>
<td>Tendinitis</td>
<td>Tendon strain or tear: acute (&lt; 2 weeks), subacute (4–6 weeks), or chronic (&gt; 6 weeks)</td>
<td>Symptomatic degeneration of the tendon with vascular disruption and inflammatory repair response</td>
<td>Three recognized subgroups: Each displays variable histology from purely inflammation with acute hemorrhage and tear to inflammation superimposed on preexisting degeneration, to calcification and tendinosis changes in chronic conditions. In chronic stage there might be interstitial microinjury, central tendon necrosis, frank partial rupture, or acute complete rupture.</td>
<td>Symptoms are inflammatory and proportional to vascular disruption, hematoma, or atrophy-related cell necrosis. Symptom duration defines each subgroup.</td>
</tr>
</tbody>
</table>

*Note: Data from Clancy, 1990; Puddu, Ippolito, & Postacchini, 1976.*