



EARLY TENDON LOADING FOR RTP MINI TOOLKIT

Adapted from Keith Baar

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Overview

Immobilisation after lower limb injury costs tissue faster than most practitioners expect. Baar's presentation shows that loading within 48 hours using low jerk isometrics accelerates collagen remodelling and return to play. This toolkit covers the protocol, the mechanism, and the lower body evidence.

THE COST OF WAITING

Musculoskeletal tissues lose structural integrity within days of unloading. Gilmore et al. showed that just 3 days of casting produces measurable tissue damage.

~10%

Muscle mass lost
(soleus and gastroc)

~20%

Tendon collagen
content lost

3 days

To produce scar-like
tendon structure

SHG imaging confirmed scar-like collagen disorganisation. After cast removal, normal activity did not recover collagen. Majima et al. (2003) confirmed similar findings in rabbit patellar tendons: increased cellularity, decreased fibrel diameter, and loss of alignment.

“ Tendons and muscles don't heal with inactivity. They only heal under load.
- Keith Baar

WHEN TO START LOADING

Bayer et al. (Kjaee's group) compared day 2 versus day 9 loading after injury. The data shows a 25% improvement in return to play time with early loading. Seven days of delay cost approximately three extra weeks.

INTERVAL BETWEEN
INJURY AND RECOVERY

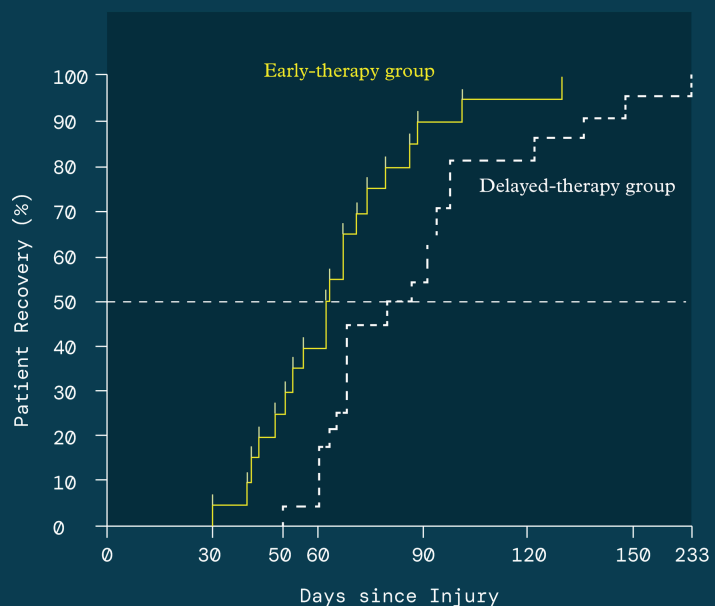
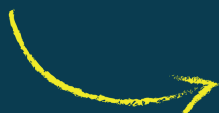


Figure 1. Early vs delayed therapy (Bayer 2017, PMID: 28953439)

LOWER BODY EVIDENCE

Why Isometrics Work

A tendon containing scar tissue is not uniform. Under load, the stiffer healthy tissue bears the stress while the compliant scar is shielded from it (Tam et al, 2025). Long duration isometric holds solve this as the healthy tissue undergoes stress relaxation over 30 seconds, the scar begins to bear load. That is the remodelling signal it needs.

Why Isometrics Over Dynamics

Steffen et al. created a patellar tendinopathy model and compared isometric versus dynamic loading with the same time under tension. Isometrics increased tendon markers (scleraxis & collagen 1). Dynamic loading increased a cartilage marker (collagen II) because pulling on the tendon compresses the central scar.

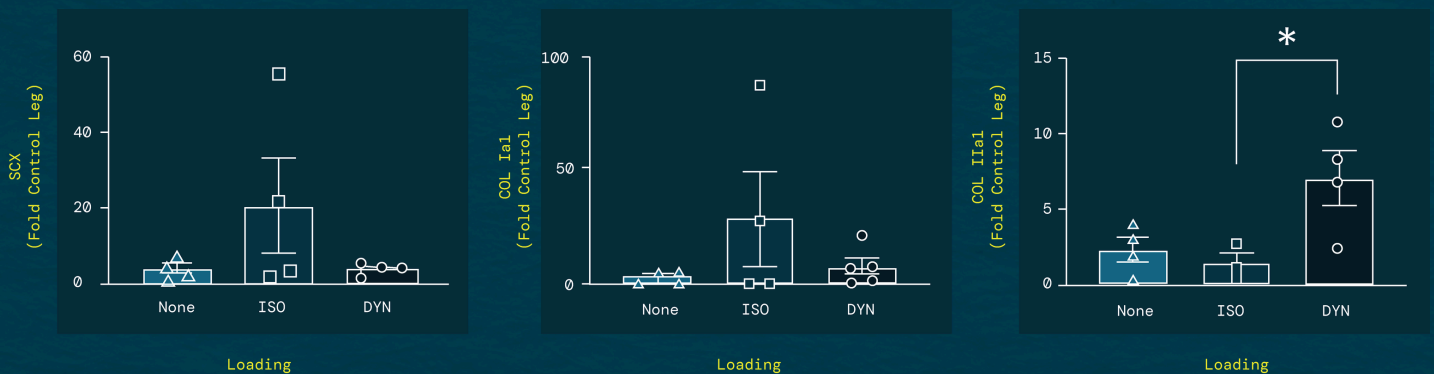


Figure 2: Scleraxis (SCX), collagen 1 (COL Iα1), collagen 2 (COL IIα2): isometric (ISO) vs dynamic (DYN) (Steffen, PMID: 35358711)

The low jerk isometric protocol

Jerk is the rate at which acceleration changes. It peaks whenever two forces act in opposing directions: a tennis player's racket accelerating forward while the ball pushes back on the return, or the rapid force reversal a sprinter's connective tissue absorbs during the stance phase of each stride.

Baar identifies jerk as the primary driver of connective tissue damage. The post-injury protocol eliminates it by developing and releasing force slowly, while still delivering enough sustained tension to trigger remodelling

1. Ramp up

Develop force slowly over – 3 seconds to a point of tension. Stay below pain.

2. Hold

Maintain for 30 seconds. Stress relaxation transfers lead into scar tissue.

3. Release

Release force slowly over 3-5 seconds. Both start and finish can produce jerk.

4. Rest

2 minutes rest. Repeat 3-4 times. Each rep reaches slightly further range.

3-4

Reps per session

2x

Sessions per day

6-8 hrs

Between sessions

30 sec

Hold duration

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