“Strong clinical evidence for advocating cryotherapy is limited.”
Cryokines: Post-op Recovery

Prolonging Activity

contains the injury

Active Inflammatory

Proliferation

Maturation

contains the injury
creates foundation for permanent repair
permanent repair

Pain
Swelling
Redness

↑Temp
Loss of Function
Base Cell Metabolism

Oxygen Meter

High

Low

Base	

Cell	

Metabolism

Oxygen Meter

High

Low

Cellular intake

Cellular output

This is a (generic) cell

This is an arteriole

Illustrates the O₂ balance

Acute Injury

Oxygen Meter

High

Low

Phagocytosis

Proinflammatory mediators (e.g., kinins, neutrophils)

Building blocks of repair (e.g., fibroblasts, collagen)

Pain Mechanism

The “Gate Theory” of Pain

#@$!*#
CONCLUSION: There is insufficient evidence to suggest that cryotherapy improves clinical outcome in the management of soft tissue injuries.

CONCLUSION: Insufficient evidence is available from randomized controlled trials to determine the relative effectiveness of RICE therapy for acute ankle sprains in adults.

Protection
Optimal
Loading
Ice
Compression
Elevation

<table>
<thead>
<tr>
<th>Adipose Tissue Thickness (Target tissue depth = 1cm)</th>
<th>Skinfold Measurement</th>
<th>Treatment Duration (Min)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20 mm</td>
<td></td>
<td>25 min</td>
</tr>
<tr>
<td>20 – 30 mm</td>
<td></td>
<td>40 min</td>
</tr>
<tr>
<td>30 – 40 mm</td>
<td></td>
<td>60 min</td>
</tr>
</tbody>
</table>
Intermittent
10 minutes on
10 minutes off
10 minutes on

Standard
20 minutes on

Cryokinetics

Acute Injury

Active
Inflammatory

Proliferation

Maturation

Contains the injury
Creates foundation for permanent repair
Permanent repair

Post-op Recovery

Acute Injury

Cryokinetics
**Arthrogenic Muscle Inhibition (AMI)**

**CONCLUSION:** After ACL reconstruction, patients with AMI who performed rehabilitation exercises immediately after cryotherapy experienced greater strength gains than those who performed cryotherapy or exercises alone.

- Surround joint with ice bags
- 20 minutes just before exercise
Cold Water Immersion

- At least 10 minutes

Whole Body Cryotherapy

- Contraindications?
- Minimal clothing
  - Bathing suit, socks, surgical mask, gloves, hat or headband
- 60 seconds at -60° C (-76°F)
- 2 to 3 min. at -110° to -140° C (-166° to -220°F)
Cryokinetics
Post-op Recovery
Exertional Heat Stroke
Acute Injury
Workout Recovery
Prolonging Activity
Cryokinetics
Heat Stroke
Acute Injury
Workout Recovery
Prolonging Activity