

# Development of an International Expert Consensus Framework for Criteria-Based Rehabilitation and Return to Performance Following Climbing Injury

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To develop an international expert consensus framework for criteria-based rehabilitation and return to performance following musculoskeletal injury in adult climbers.

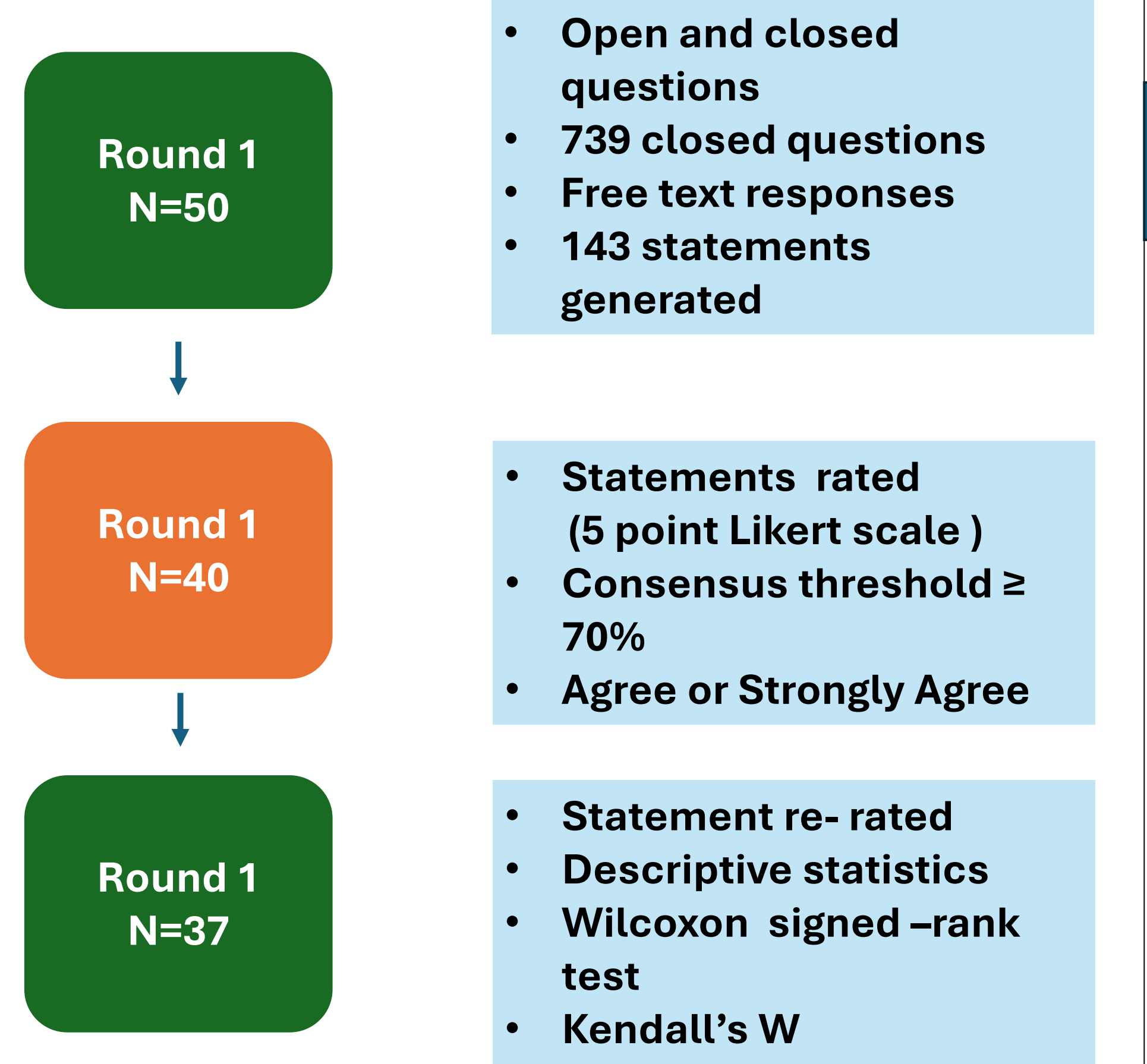
## 1 Background

- Climbing is an Olympic and participation sport with substantial upper-limb demands. Acute and chronic injuries affecting the fingers, wrist, elbow, and shoulder are well documented, yet guidance for rehabilitation and return to performance remains limited.
- Successful return to climbing requires more than symptom resolution. Clinicians must consider tissue loading, restoration of physical capacity, climbing-specific exposure, psychological readiness, and progression toward performance demands.
- At present, no climbing-specific consensus framework integrates these components across the rehabilitation pathway.

## 2 Aim and Objectives

- Identify consensus-based outcome measures for rehabilitation and return to performance.
- Identify consensus-based components of staged rehabilitation.
- Identify consensus-based components of return-to-sport and return-to-performance progression.

## 3 Methods



## 4 Panel Profile (Round 1)

**50** international experts at baseline

Experts represented **18** countries

**70%** physiotherapists or physical therapists

Disciplines managed: sport climbing, bouldering, traditional climbing, speed climbing, ice climbing

**98%** of respondents were active climbers

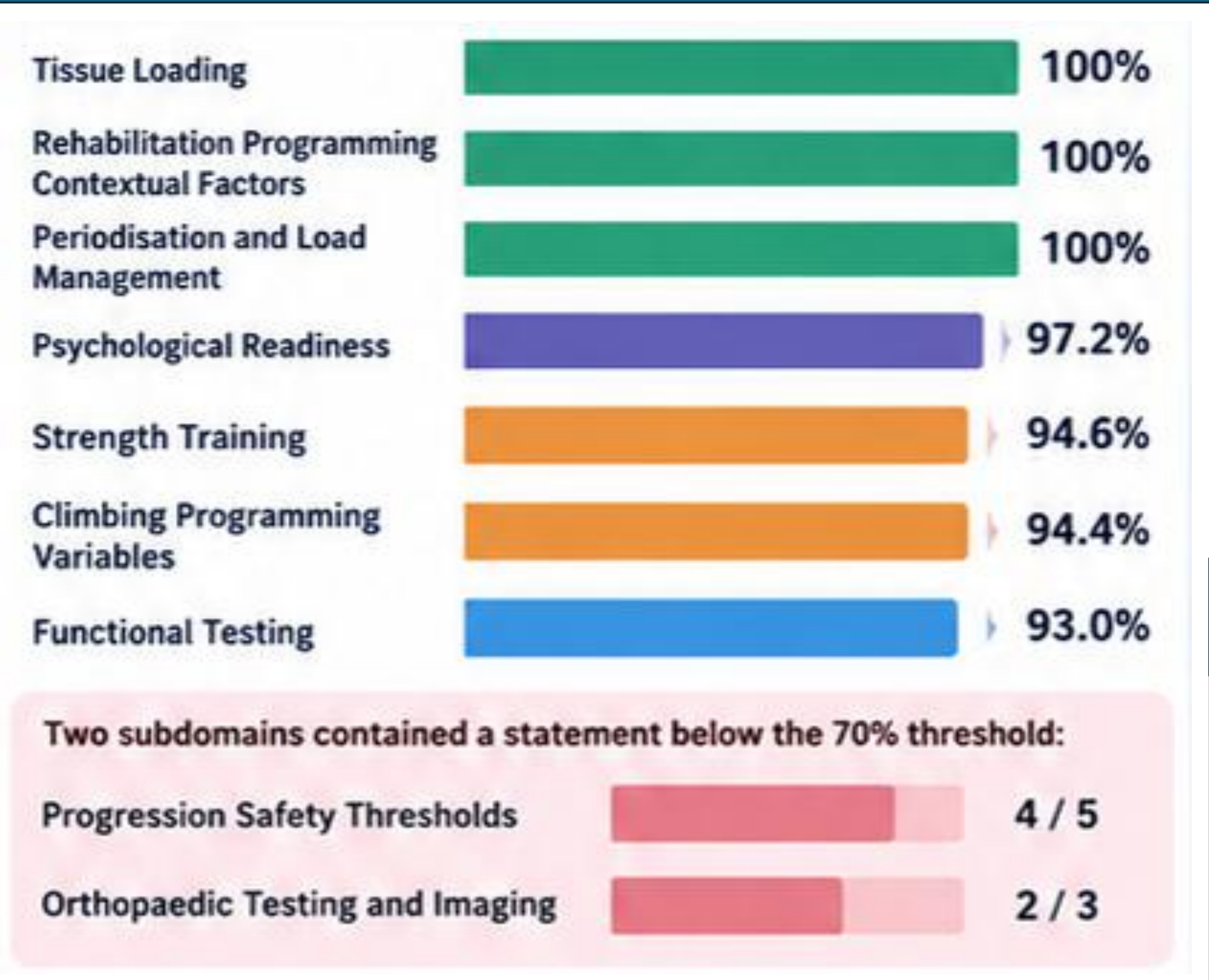
## 5 Key Results

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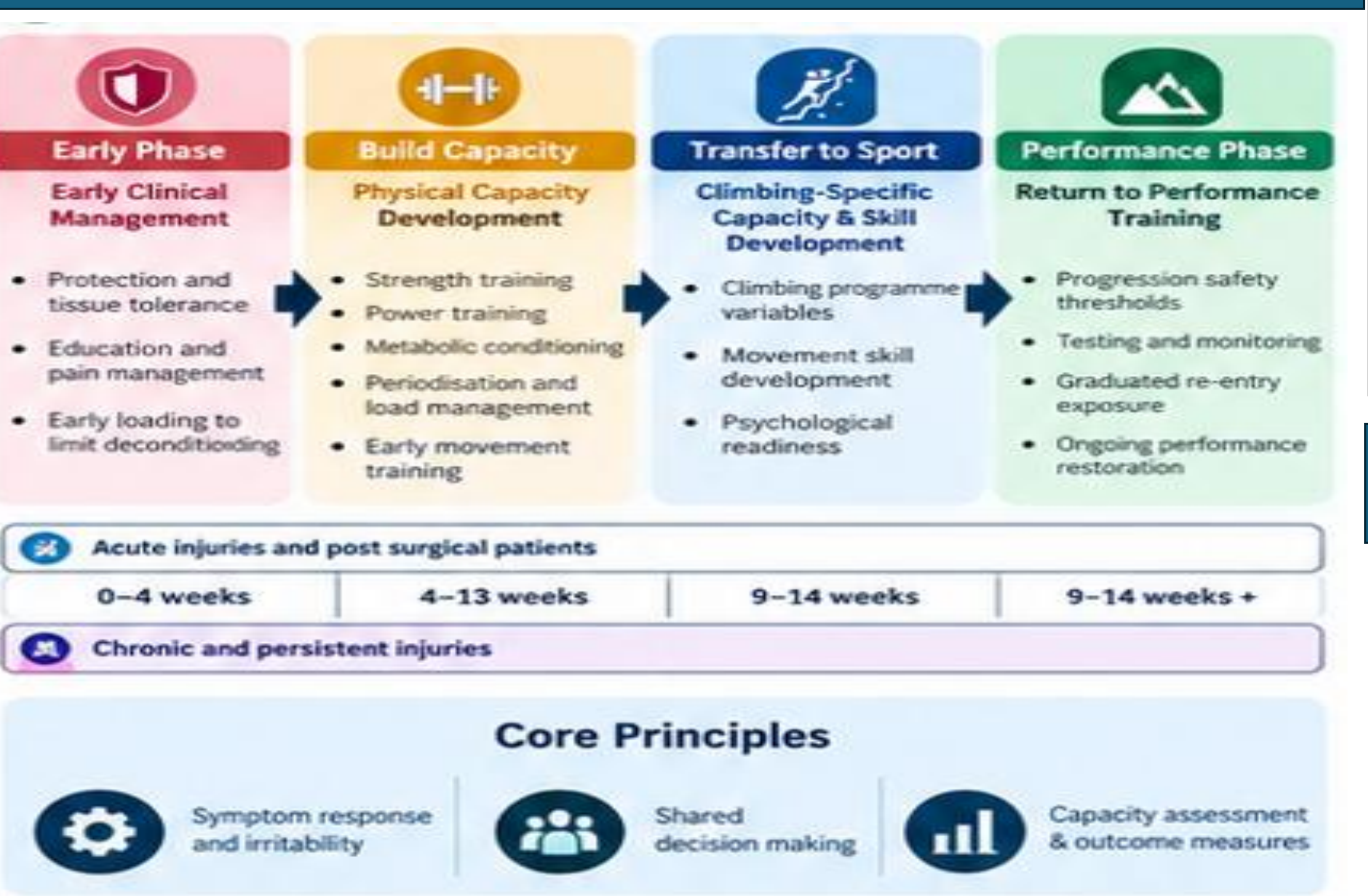
Final statements reached consensus

**94.4 %** OF Round 3 statements met the predefined  $\geq 70\%$  agreement threshold.

### Subdomain Agreement (Round 3)



## 6 The Consensus Framework



## 9 Conclusion

- An international expert panel reached broad consensus on the components of rehabilitation and return to performance following climbing injury.
- The resulting framework supports a staged, criteria-based approach integrating tissue management, physical capacity, climbing-specific exposure, psychological readiness, and multidimensional assessment.
- The framework should be viewed as an expert-derived clinical foundation rather than a validated decision tool. Future work should establish measurement properties, performance thresholds, and real-world clinical validity.

## 7 What Did Experts Prioritise ?

**Early clinical management**

- Protect healing tissues
- Manage pain and symptom response
- Educate the climber
- Limit local and regional deconditioning
- Introduce appropriate early loading

**Capacity development**

- Restore strength
- Develop power when appropriate
- Include metabolic conditioning according to discipline
- Use periodisation and load management
- Begin early movement retraining

**Transfer to climbing**

- Manipulate route difficulty and wall angle
- Progress climbing volume
- Develop movement skill
- Use graded climbing-specific exposure
- Address psychological readiness

**Return to performance**

- Use progression safety thresholds
- Monitor symptoms and performance
- Use objective testing
- Use on-wall functional assessment
- Restore performance progressively

## Clinically Important findings (Round 3)

**Pain and symptom response monitoring**

Median 5 (IQR 5-5)

**Sport-specific late-stage training**

Median 5 (IQR 5-5)

**On-wall graded functional testing**

Median 5 (IQR 4-5)

**Psychological readiness**

Median 5 (IQR 4.75-5)

**Objective finger strength and upper-limb pulling strength testing were also strongly supported.**

## 8 Post-Delphi Endorsement

**36 OF 50 (72%)** panel members completed the final manuscript review.

**100%** agreed the manuscript reflected the Delphi recommendations

**97.1%** endorsed the clinical relevance of the recommendations

**31.4 %** recommended minor revisions before submission

**100%** would be associated with the work and consented to be named



## Acknowledgements

We thank all members of the international Delphi panel and the Climbing Rehabilitation Delphi Group for their contribution to the development and final review of this framework. **Contact: Uzo.ehiogu@nhs.net**