Hawkin

TRUSTRENGTH DYNAMOMETER

THE NECK TESTING SOLUTION

THE IMPORTANCE OF

NECK ASSESSMENT AND MONITORING

Neck strength assessment is a critical component in the prevention of injuries, rehabilitation, and performance monitoring, especially among athletes involved in contact sports such as rugby[1] and wrestling[2]. Lower neck strength capacity is postulated to be a modifiable risk factor for head and neck injuries, including concussion[3,4]. Regular assessment may help to identify individual weaknesses early, enabling the implementation of targeted neck strengthening programs to reduce the risk of injury.

The TruStrength dynamometer device provides a solution that addresses the essential criteria for establishing a neck strength assessment protocol[5]. By providing real-time feedback and standardized measurement conditions, it addresses common limitations of manual muscle testing and handheld dynamometry, such as tester variability and inconsistent resistance application.

The TruStrength system makes neck strength testing quick, reliable, and repeatable, empowering practitioners with real-time data that supports decision making and elevates client outcomes.

The Hawkin team have designed and validated several reliable testing protocols, giving coaches and clinicians confidence in their neck strength assessments.

Although the TruStrength device can be used to assess neck force capabilities using a variety of protocols, our team recommends the following tests, which are described in this guide:

- ***Neck extension*** *– Assesses the posterior cervical muscles, which play a key role in stabilizing the head and resisting excessive forward motion.*
- ***Neck flexion*** *– Assesses the anterior muscles of the neck which play a key role in stabilizing the head during rapid deceleration or impact events.*
- ***Neck lateral flexion (left and right)*** *– Assesses the lateral muscles of the neck which play a key role in stabilizing the neck and posture support.*

PROTOCOL OPTION 1:

FOUR DIRECTION NECK ASSESSMENT

Equipment checklist

- ✓ TruStrength
- ✓ Multiplanar Clamp Mount or Pivot
- ✓ Small Paddle
- ✓ Plyo Box or Plinth (not provided)
- ✓ Gym Rack (not provided)

BENEFIT

There is no requirement for additional equipment in compression mode (i.e., harness and straps). This reduces time between tests and simplifies directions if testing is done in large groups.

INSTRUCTIONS

Attach the TruSrength using the multiplanar clamp mount to ensure a direction line of force application for each test direction:

- Flexion (Frontal bone superior to the eyebrows)
- Extension (Occiput)
- Lateral Flexion (Temporal bone above superior aspect of the ear helix)

Important things to consider when positioning your athlete for testing:

- To isolate the neck, the box/plinth should be high enough where the athlete’s feet cannot touch the ground. This prevents athlete’s using their base of support as a ground anchor to produce higher forces.
- Ensure your athletes place their hands across their chest and not gripping onto the box/plinth to avoid anchoring themselves to produce more force.
- If you notice your athlete performing any other compensatory movements e.g., torso flexion, this trial should be deleted and re-tested, cueing your athletes to move only at the neck.

PROTOCOL OPTION 2:

FOUR DIRECTION NECK ASSESSMENT

Equipment checklist

- ✓ TruStrength
- ✓ Eyebolt
- ✓ Carabiner ×2
- ✓ Multiplanar Clamp Mount or Pivot
- ✓ Adjustable Strap
- ✓ Gym Rack (not provided)
- ✓ Plyo Box or Plinth (not provided)
- ✓ Harness (not provided)

BENEFIT

Tensile neck assessments with a strap or harness allow for standardized testing in each test direction and can maximize accessories already being used for specific neck training

INSTRUCTIONS

Attach the TruSrength using the multiplanar clamp mount to ensure a direction line of force application from the harness D link or adjustable strap:

- Flexion (Frontal bone superior to the eyebrows)
- Extension (Occiput)
- Lateral Flexion (Temporal bone above superior aspect of the ear helix)

Important things to consider when positioning your athlete for testing:

- The box/plinth should be high enough where the athlete’s feet cannot touch the ground. This helps prevent any compensatory movements occurring at the legs/feet.
- Ensure your athletes place their hands across their chest and not gripping onto the box/plinth to avoid anchoring themselves to produce more force.
- If you notice your athlete performing any other compensatory movements e.g., torso flexion, this trial should be deleted and re-tested, cueing your athletes to move only at the neck.

DATA & METRICS

Every TruStrength test is processed the same way, every time. Removing human error and inconsistency ensure results reflect real changes, not differences in how the data was handled.

PEAK NET FORCE

Peak Net Force provides insight into an athlete's maximal strength. This metric is great to track during mid-stage rehabilitation and/or pre-season, and early in-season.

NET IMPULSE / AVERAGE FORCE

The average force or impulse can give you insight into an athlete's ability to sustain force over the entire contraction duration.

RAPID FORCE / RFD

Net force at 50-200 ms and rate of force development (RFD) during the repetition can give you insight into the athlete's explosive strength capability.

The TruStrength system makes strength testing quick, reliable and repeatable, empowering practitioners with real-time data that supports decision making and elevates client outcomes.

TAG SELECTION

This example represents a tag workflow for the Lateral Flexion test. Accurate tags are essential for insightful data analysis, so you know HOW you tested when it comes to reviewing results.

TEST NAME: **NECK LATERAL FLEXION TENSILE**
TEST LIMB: **RIGHT**

Protocol Considerations

LONGER DURATIONS
10+ seconds
Recommended if muscle endurance is of interest

MODERATE DURATIONS
3-5 seconds
Recommended if maximal strength is of interest

SHORT DURATIONS
1 second
Recommended if rapid force expression is of interest

VERBAL CUES
“fast” and “hard"
Recommended for any test duration (assuming uninjured athlete)

Whether you are profiling, screening or monitoring your athletes, TruStrength brings precision and confidence to strength testing.

Join leading professionals who are using Hawkin data to drive smarter decisions.

ENDNOTES

[1] Farley T, Barry E, Sylvester R, De Medici A, Wilson MG. Poor isometric neck extension strength as a risk factor for concussion in male professional Rugby Union players. British Journal of Sports Medicine. 2022;56(11):616-621.

[2] Bailes JE, Petschauer M, Guskiewicz KM, Marano G. Management of cervical spine injuries in athletes. Journal of Athletic Training. 2007;42(1):126.

[3] Streifer M, Brown AM, Porfido T, Anderson EZ, Buckman JF, Esopenko C. The potential role of the cervical spine in sports-related concussion: clinical perspectives and considerations for risk reduction. Journal of Orthopaedic & Sports Physical Therapy. 2019;49(3):202-208.

[4] Peek K, Elliott JM, Orr R. Higher neck strength is associated with lower head acceleration during purposeful heading in soccer: a systematic review. Journal of Science and Medicine in Sport. 2020;23(5):453-462.

[5] Peek, K., 2022. The measurement of neck strength: a guide for sports medicine clinicians. Physical therapy in sport, 55, pp.282-288.