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WHOLE BODY MECHANICS OF JAPANESE ELITE AND NON-ELITE MALE WRESTLERS DURING A TACKLE

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Background

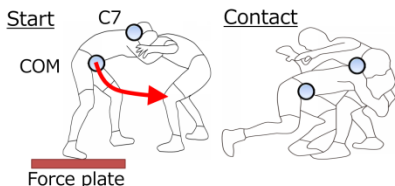
- A double-leg tackle (attack) is frequently used technique to score in freestyle wrestling match.
- During a double-leg tackle, a tackler initiates a forward step, contacts with a defender, grabs a defender's knees, and finally scores a takedown [1].
- Success rate of double-leg tackles is higher in winners than that in losers [2].
- However, the mechanics of the tackle are still not clear.

Purpose

To compare the features of the double-leg tackle maneuver of **Elite** and **Non-Elite** wrestlers.

Methods

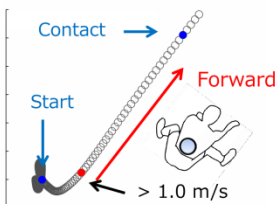
- Subjects
 - ✓ **11 Elite Wrestlers: 3 Olympic medalists**
 - ✓ **8 National level**
 - ✓ **9 Non-Elite Wrestlers: Collegiate level**
- Defender: One experienced wrestler
 - ※All wrestlers belonged to the light weight categories.
- Procedures
 - ① Adjustment defender's posture to a given position (the height of the shoulder & hip markers)
 - ② A double-leg tackle with maximal effort
- Variables
 - ✓ COM & upper part of the trunk (C7) trajectory from start to contact (VICON, 200 Hz)
 - ✓ GRF at a trailing foot (Kistler, 1000 Hz)



- Definition of the local coordinate system

✓ Forward axis was determined using the COM trajectory.

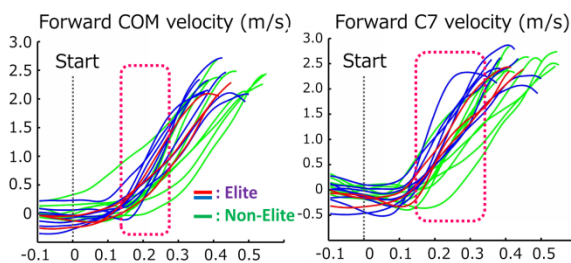
✓ Kinetic and kinematic data were rotated to align with the local coordinate system.



COM trajectory in the horizontal plane with Global Coordinate System

	Elite	Non-Elite
Initial COM height (m)	0.71 ± 0.03	0.71 ± 0.02
Downward COM displacement (m)	0.18 ± 0.07*	0.25 ± 0.06
Duration (start to contact) (s)	0.42 ± 0.05	0.46 ± 0.07

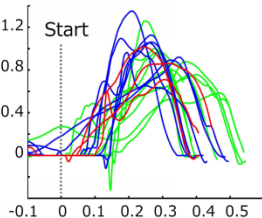
* Significant difference between Elite & Non-Elite (p < 0.05)



- Peak velocity was not different.
- Velocity during 0.15-0.25s in **Elite** tended to be higher (p < 0.1).

- Peak velocity was not different.
- Velocity during 0.15-0.35s in **Elite** was higher (p < 0.05).

Forward GRF at trailing foot (N/N)



- Peak force was not different.
- Time to peak in **Elite** was shorter (p < 0.05). (0.26 vs 0.34 s)

- A double-leg tackle can be finished in numerous ways depending on the situation [1].
- To increase forward COM and C7 velocities in early phase is more important than those at contact.

Conclusions

During a double-leg tackle,

- **Elite wrestlers** more rapidly produce forward GRF at the trailing foot and move forward with a smaller downward movement than **Non-Elite Wrestlers**.
- Moreover, fast upper trunk movements are also important to grab a defender's knees.

References

- [1] Mysnyk et al., Winning Wrestling Moves. Human Kinetics, 1994
- [2] Cipriano, J Strength Cond Res, 7(3) 133-140, 1993

