

JOINT MOBILITY IN SITUATIONAL SPORTS

ROM, VELOCITY, FLUIDITY AND SYMMETRY



In situational sports (such as football, basketball, rugby, volleyball, hockey, and racket sports), joint mobility goes beyond simple range of motion. It is a prerequisite for technical **efficiency**, response speed, and **injury prevention** in environments characterized by variability and unpredictable demands.





Here are the four fundamental parameters
for an advanced assessment:



**1) RANGE OF
MOTION (ROM)**

2) VELOCITY

3) FLUIDITY

4) SYMMETRY



RANGE OF MOTION (ROM)



Articular ROM represents the total movement range a joint can express. In situational sports, what matters is not only the absolute ROM value, but especially how functional it is within complex and highly variable movement patterns.





ROM is functional in situational sports when it:

- allows fast and controlled **changes of direction** (hip, knee, ankle);
- **facilitates large upper-limb swings** (shoulder, elbow);
- **enables the absorption of unpredictable external forces** (landings, contacts, sudden rotations).

An insufficient ROM increases the risk of injuries, while excessive and uncontrolled ROM can compromise joint instability.

JOINT MOVEMENT VELOCITY



The velocity of movement in a joint-mobility exercise describes how quickly the joint travels through its range of motion.

It is a direct indicator of neuromuscular efficiency and the ability to perform rapid movements while maintaining control.





Its role in situational sports is:

- **determines the effectiveness of actions** such as hip rotations during changes of direction
- **enables rapid movements with minimal resistance**
- **reflects the quality of muscular activation and reflex readiness**

Assessing movement velocity is essential because excessively low velocity may indicate stiffness or compensatory strategies, while very high but poorly controlled velocity can point to an increased risk of joint instability.

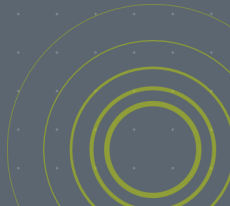
MOVEMENT FLUIDITY



Movement fluidity describes the continuity and smoothness of motion throughout the joint's range.

In situational sports:

- **fluid movements** indicate excellent neuromuscular synchronisation
- **irregular, choppy movements** suggest stiffness apprehension, incomplete recover or coordination deficits





Elite athletes typically display more fluid movements even at high speeds. Greater fluidity allows them to react more effectively to unexpected stimuli, reducing both energy cost and joint instability. During changes of direction, shots, or rotations, reduced fluidity is associated with higher joint stress.

ARTICULAR SYMMETRY

Articular symmetry compares the movement of the same joint between the dominant and non-dominant side. In situational sports, small asymmetries are normal and functional, while larger imbalances are considered predictors of injury risk.





Why Symmetry is crucial:

- it affects the effectiveness of change of direction, jumps, and decelerations;
- it is strongly associated with the risk of injuries such as ACL tears, tendinopathies, and shoulder instability;
- certain sports (e.g., football, tennis, handball) naturally generate asymmetries that must be monitored to prevent excessive deviations.



SUMMARY

- Functional **ROM** matters more than maximal ROM; it must be useful, stable and dynamically controlled.
- **Angular velocity**, measurable through inertial sensors, reveals how the joint moves, not only how much it moves.
- **Evaluating fluidity** reveals movement quality beyond simple amplitude or speed.
- **Assessing symmetry** reveals how evenly each side contributes to movement, providing insight into functional balance.