Materiales docentes para el alumnado
Clases teóricas

UNIVERSIDAD DE MURCIA

Lesiones musculares

Musculatura isquiosural. Parte 1

Asignatura: Readaptación deportiva y reentrenamiento físico-deportivo

Docentes

Dr. Francisco Ayala	francisco.ayala@um.es
Dr. Francisco Javier Robles Palazón	franciscojavier.robles1@um.es
D.ª Alba Aparicio Sarmiento	alba.aparicio@um.es
Prof. Pilar Sainz de Baranda	psainzdebaranda@um.es

Facultad de Ciencias del Deporte
Universidad de Murcia - Campus de San Javier

LESIÓN DE LA MUSCULATURA ISQUIOSURAL

Uno de los jugadores del primer equipo ha sufrido una **lesión** de la musculatura de la parte posterior del muslo (**isquiosurales**). El equipo médico te encarga a ti la **readaptación** del deportista.

Epidemiology of injury

2 injuries per player per season

On average, 12% of the squad is unavailable due to injury at any point during the season

5x times higher risk of injury during match

Injury incidence increases during the last part of each half

Higher incidence of overuse injuries is reported during the preseason

A typical 25-player squad can expect 10 thigh strains each season, with seven hamstring and three quadriceps strains

Muscle injuries represent almost one third of all time-loss injuries

2-3x times higher risk of ACL injury in female players compared with their male counterparts

7 groin injuries per team each year

Ankle injuries seem to be relatively important in modern football, both in term of incidence and of time loss, being preceded by thigh, knee and groin as the most common locations of injury

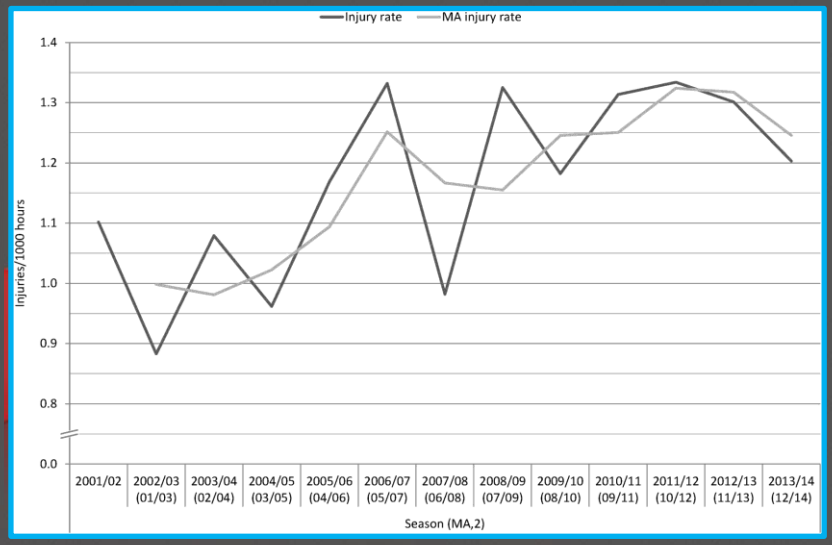
Eirale et al. (2013)

Hamstring injuries have increased by 4% annually in men's professional football since 2001

36 clubs from 12 European countries followed between 2001 and 2014

22% OF PLAYERS SUSTAINED AT LEAST ONE HAMSTRING INJURY DURING A SEASON

(1614 hamstring injuries were recorded)



The time-trend analyses showed an annual average 2.3% increase in the hamstring injury rate year over year and 4.1% increase in the total hamstring injury burden over the 13-year study period

Factors such as player load, match frequency, playing style, team management, continuity of club medical and technical staff, etc, could be important underlying external risk factors for hamstring injury, and should be considered in future hamstring injury prevention initiatives and injury management

#ALERT

Ekstrand et al. (2016)

MECANISMO DE LESIÓN

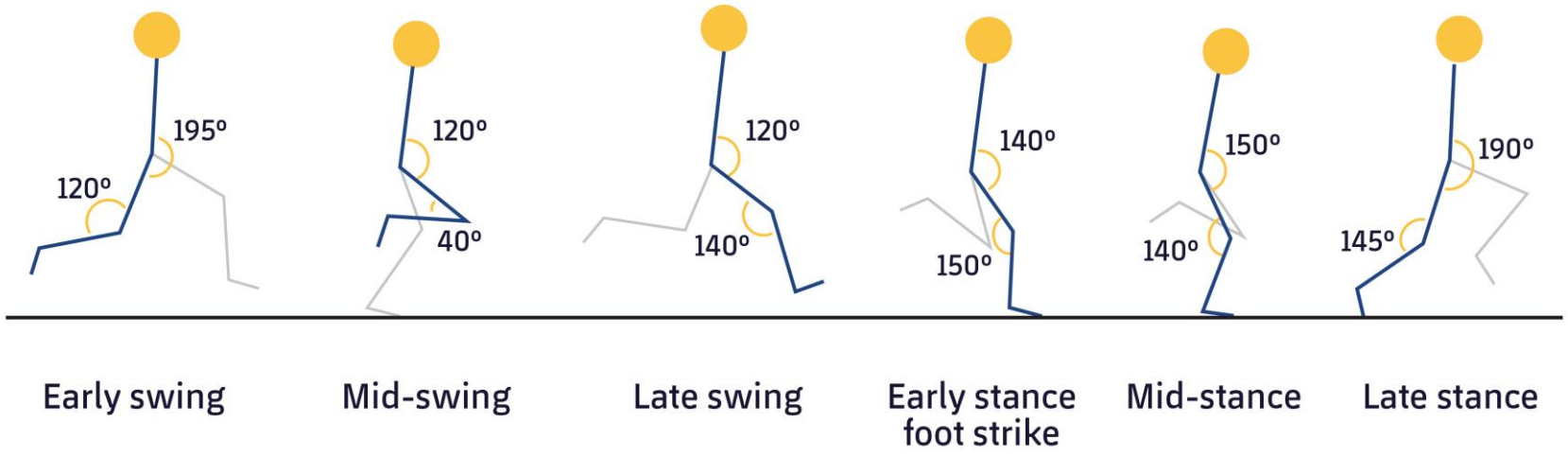
Sprint-type injury

Aceleraciones máximas (normalmente lineales) hasta alcanzar velocidades de carrera superiores al 70-80%.

Long head of biceps femoris (proximal region [musculotendinous junction])

Askling et al. (2013)

MECANISMO DE LESIÓN



INJURY MECHANISMS

LATE SWING PHASE

Hamstring action and moments:

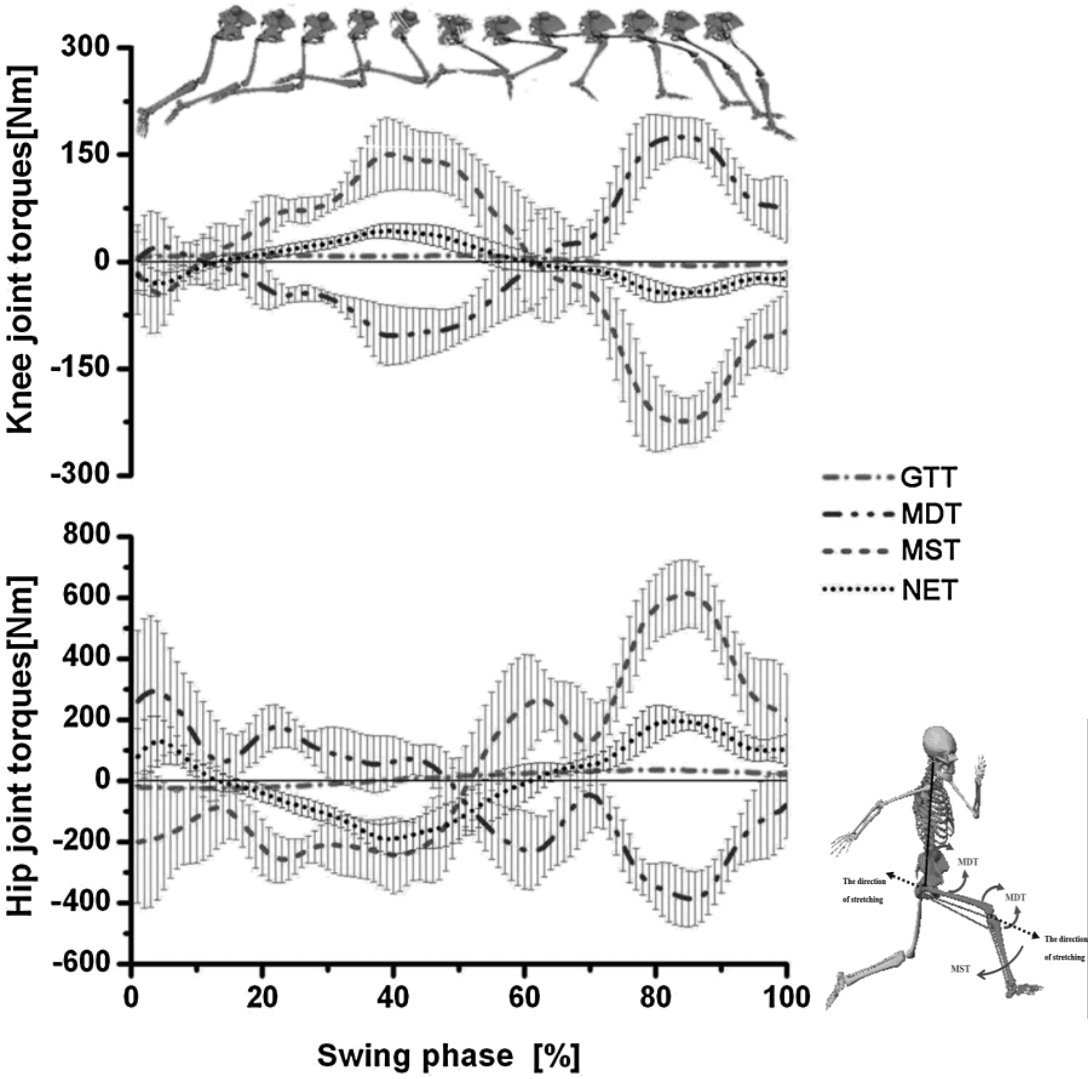
- **Strong either eccentric or isometric contraction** (whilst at submaximal length) to decelerate the shank, producing in particular a high knee flexion moment using series elastic component (SEC).

Opposing moments (internal [**quadriceps and hip flexors**])

- **Vastus muscles** begin to activate at the end of swing producing **a weak (early) contraction**. Hip flexors are almost inactive.

Opposing moments (external):

- **Minimal opposing forces** (the light force of air resistance would actually assist hamstring in decelerating the shank).



Orchar (2012); Sun et al. (2015)

INJURY MECHANISMS

EARLY STANCE PHASE

Hamstring action and moments:

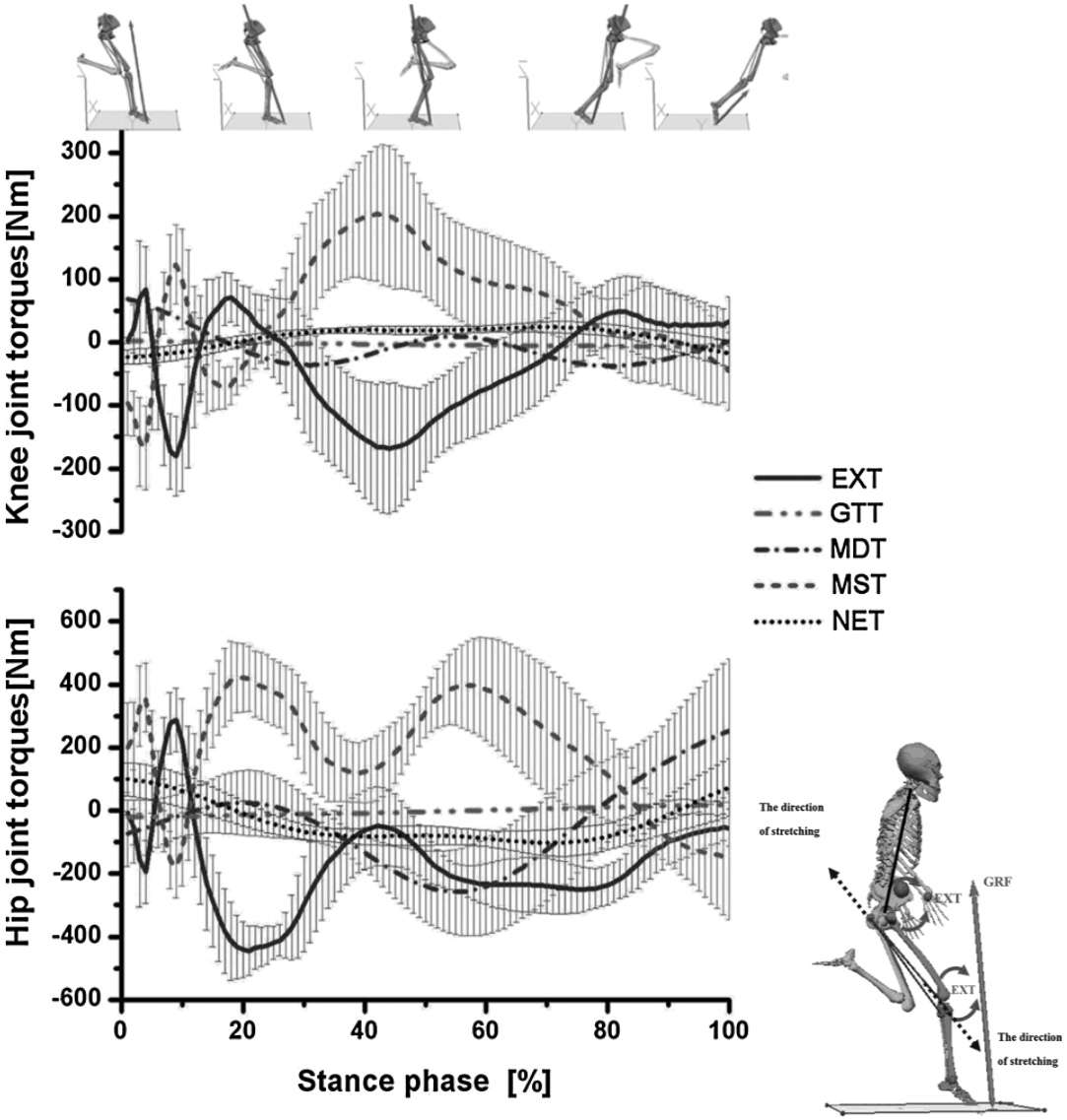
- **Strong concentric contraction** to resist opposing forces and help produce a hip extensor moment and knee flexor moment.

Opposing moments (internal [**quadriceps and hip flexors**])

- **Vastus muscles** increase their activation in early stance, producing a **stronger contraction**, whilst rectus femoris starts to contract.

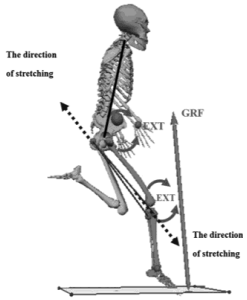
Opposing moments (external):

- Potentially **large hip flexor & knee extensor joint reaction moments** (i.e. GRF vector is anterior to the knee and hip joints, due to forefoot-strike).



Orchar (2012); Sun et al. (2015)

MECANISMO DE LESIÓN



Stance phase

Early stance breaking

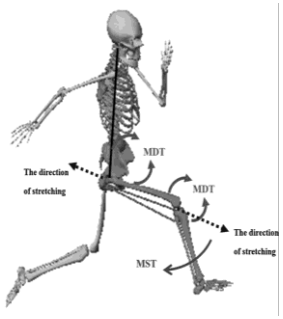
Late stance propulsion

Join torque from muscle contractions & ground reactions forces

Hip: from extension dominance
Knee: from extension

→ to flexion moment
→ to flexion moment

⬆ Hip & Knee torques
⬆ Tensile Force



Swing phase

Early & middle swing recovery

Late swing pre-activation

Join torque from muscle & motion-dependent torque reactions forces

Hip: from large flexion moment
Knee: from small extension

→ to large extension moment
→ to small flexion moment

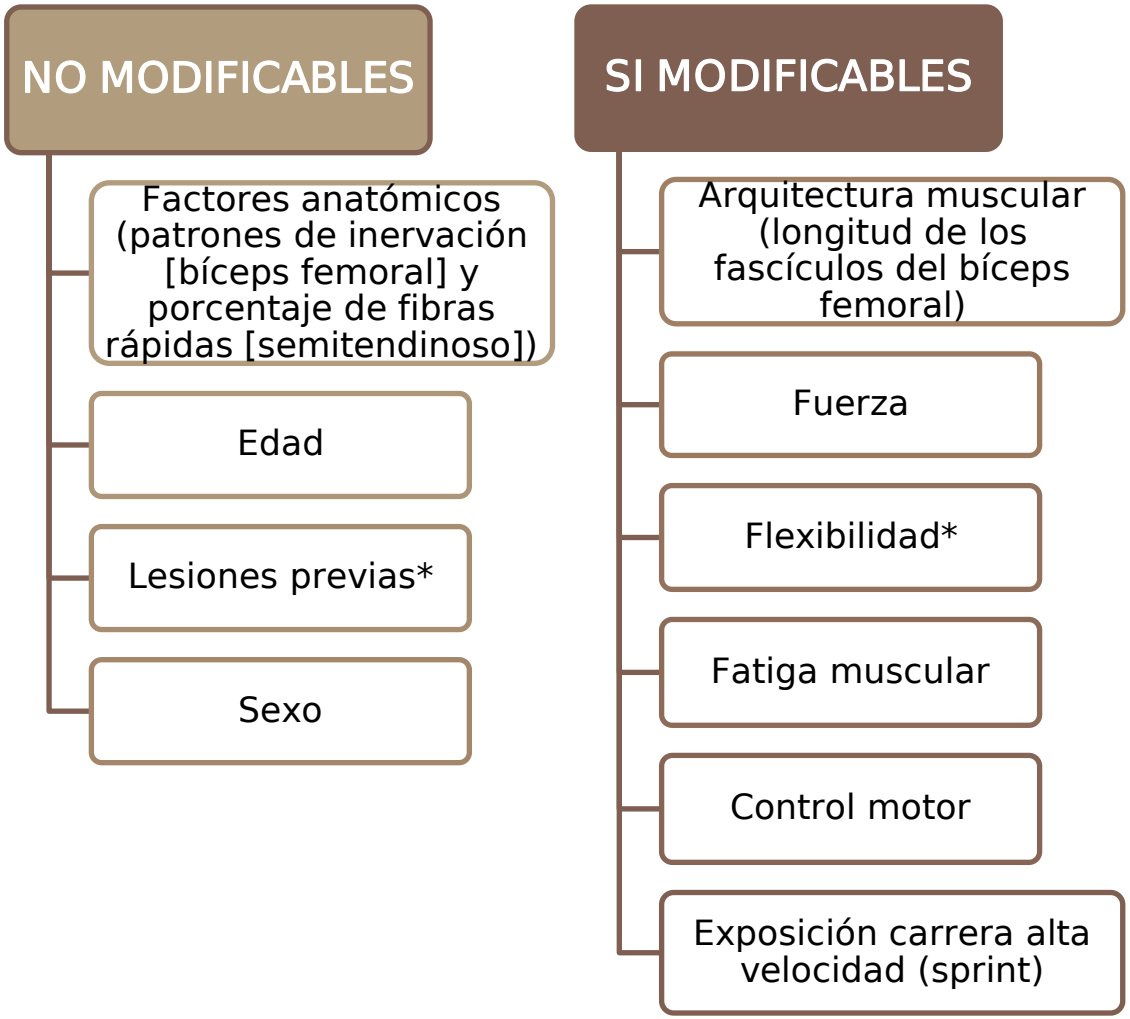
Lengthening contraction
⬆ Strain & activation

Huygaerts et al. (2020)

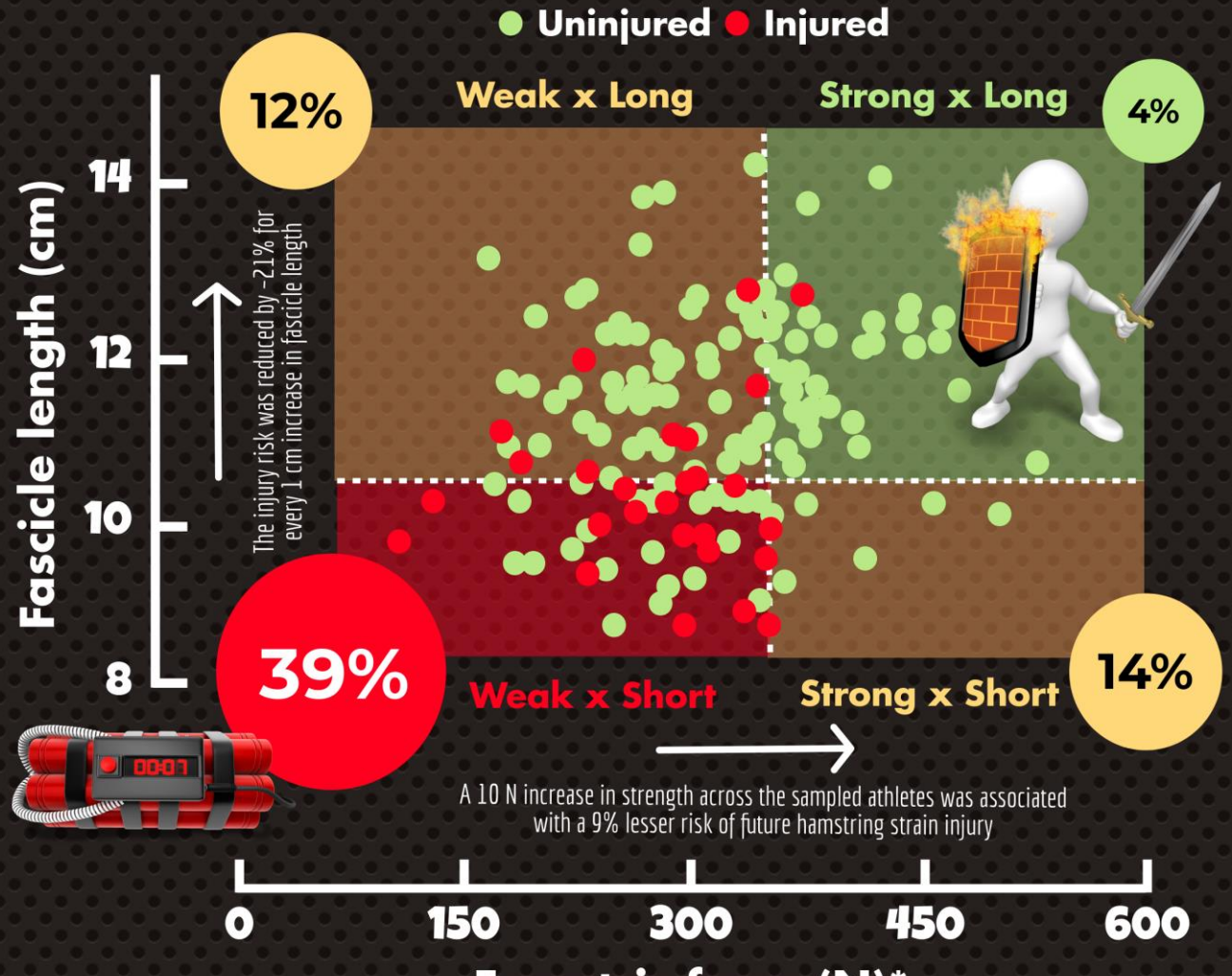
MECANISMO DE LESIÓN

- **Aceleraciones máximas** (normalmente lineales) hasta alcanzar velocidades de carrera superiores al 70%.
- Las fases de la carrera "**EARLY STANCE**" y "**LATE SWING**" son las que más estrés imponen a la musculatura isquiosural.
- Los **extensores de cadera** (glúteo) podrían ser "**ayudantes**" de los isquiosurales para realizar el movimiento de oposición de la pierna durante la fase "early stance".
- La musculatura isquiosural actúa como extensor de cadera bajo contracción concéntrica (**cadena cinética cerrada**) y como flexor de rodilla bajo contracción excéntrica (**cadena cinética abierta**). Igualmente, existe un cierto momento de contracción isométrica (cadena cinética abierta y cerrada).
- La **PELVIS** y el control de la misma juega un papel relevante en la cinemática de la carrera a máxima velocidad, sobre todo el la fase "SWING".
- Los **flexores plantares** son muy importantes para la amplitud de la zancada y la fuerza de reacción contra el suelo.

FACTORES DE RIESGO INTRÍNSECOS



Hamstring Strain Injury: Escape the Quadrant of Doom



Players with short biceps femoris long head fascicles and low eccentric strength were 4.1 and 4.4 times, respectively, more likely to suffer a future hamstring strain injury than those with longer fascicles or higher levels of strength

This finding represents a solid argument for eccentric training to prevent hamstring strain injuries

*Eccentric knee flexor stength (Nordic)

FACTORES DE RIESGO INTRÍNSECOS

Pizzari et al. (2020)

FACTORES DE RIESGO INTRÍNSECOS

FACTORES DE RIESGO INTRÍNSECOS

Isometric Strength
(ISOM-SPORT)

Ayala et al. (2018)

FACTORES DE RIESGO INTRÍNSECOS

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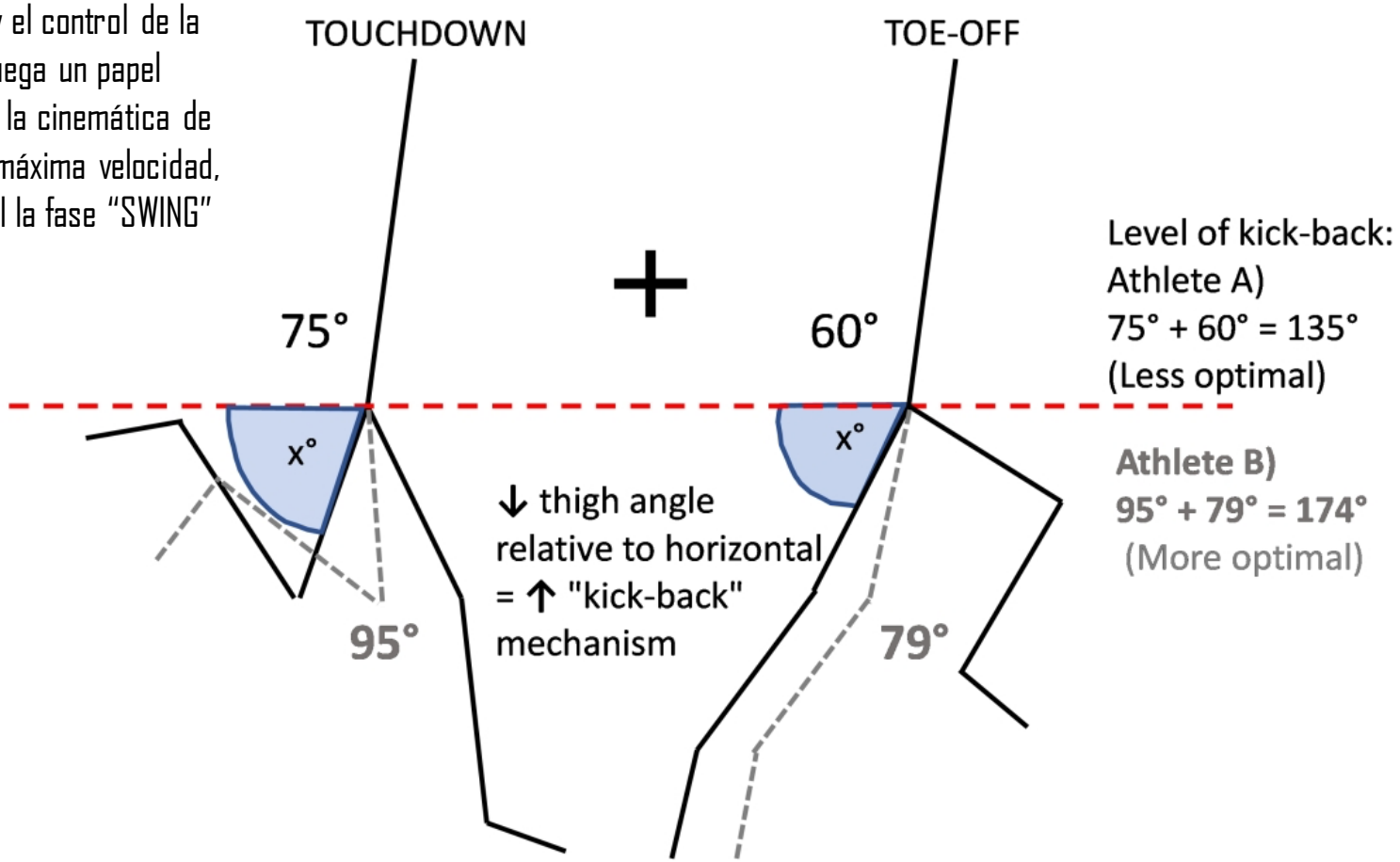
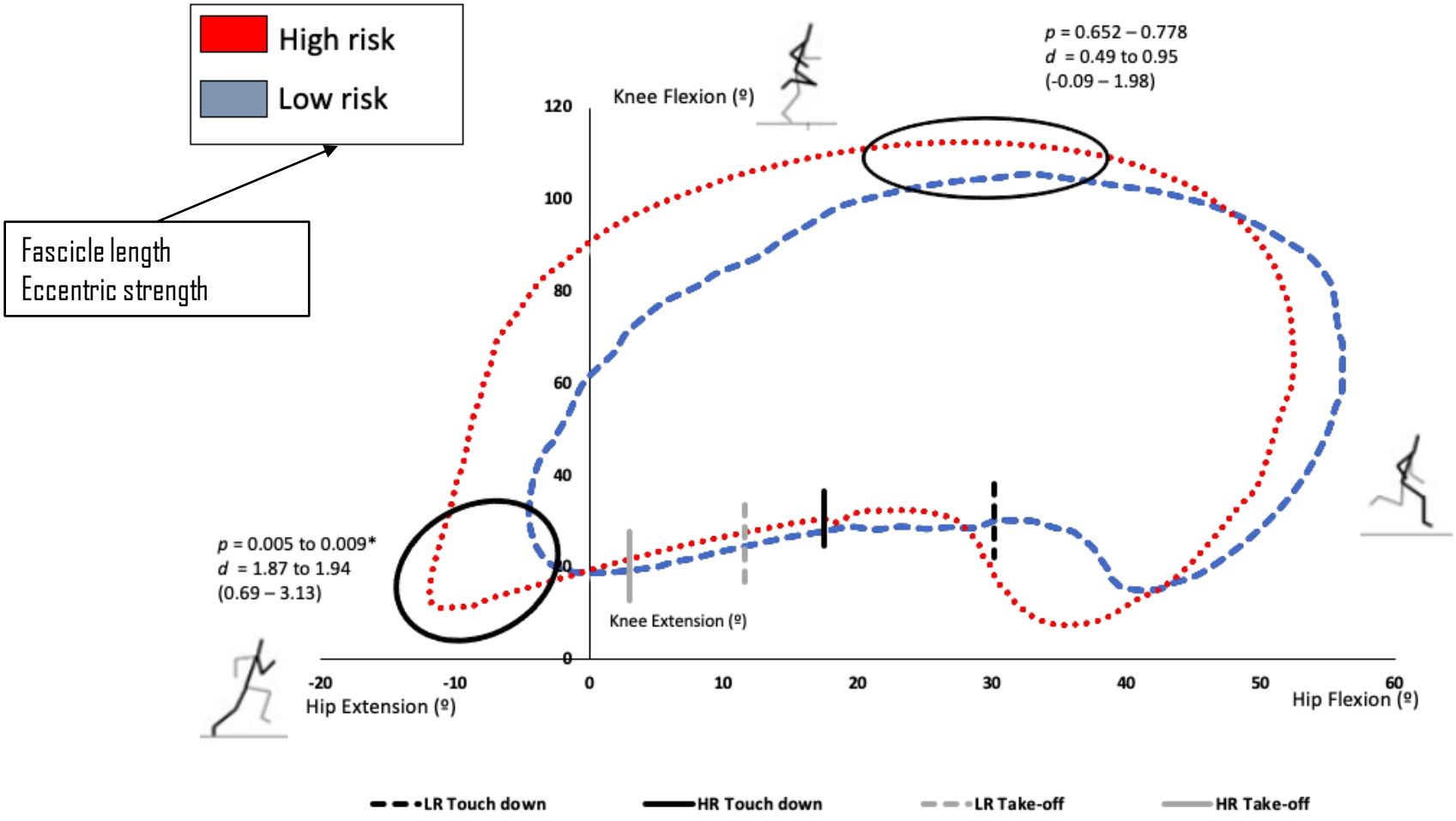


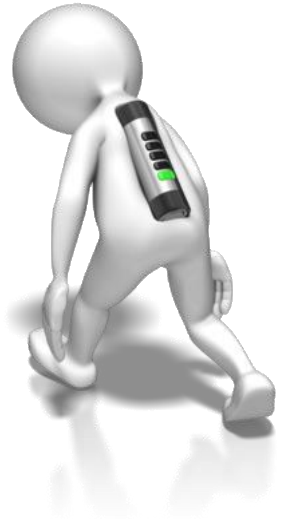
Green et al. (2020)

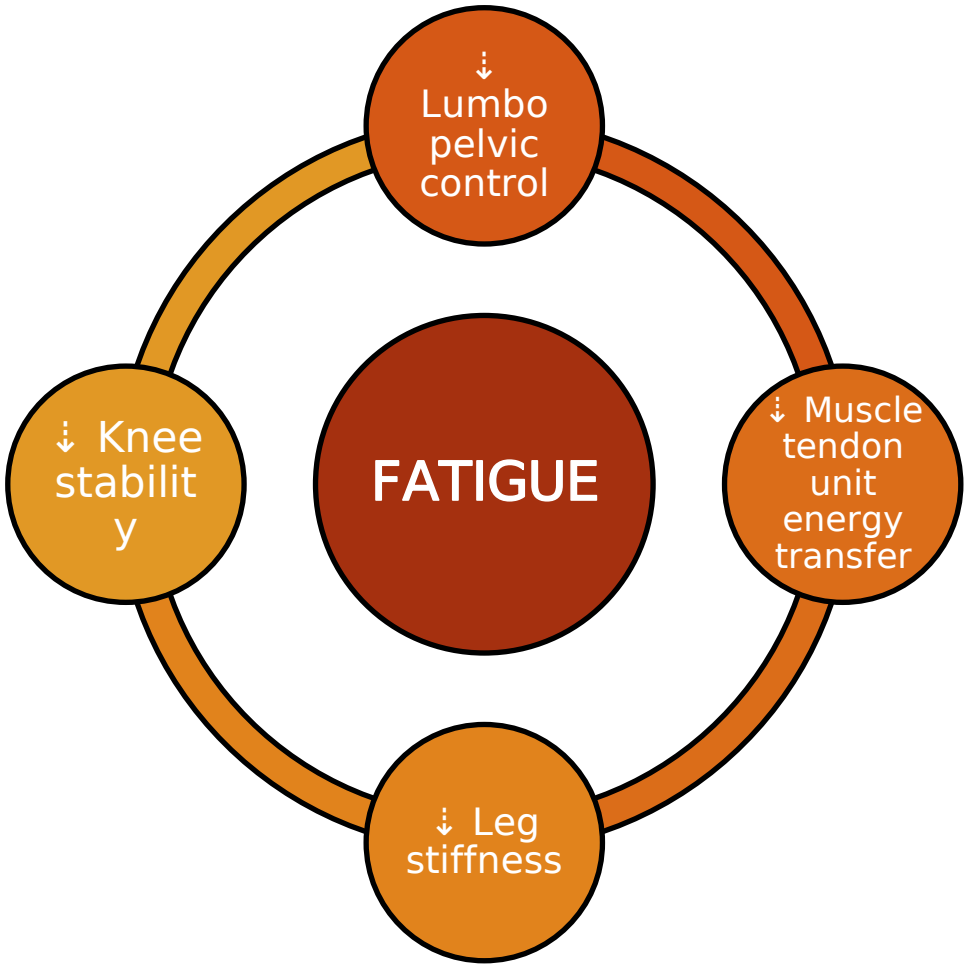
FACTORES DE RIESGO INTRÍNSECOS



Ripley et al. (2021)

FACTORES DE RIESGO INTRÍNSECOS





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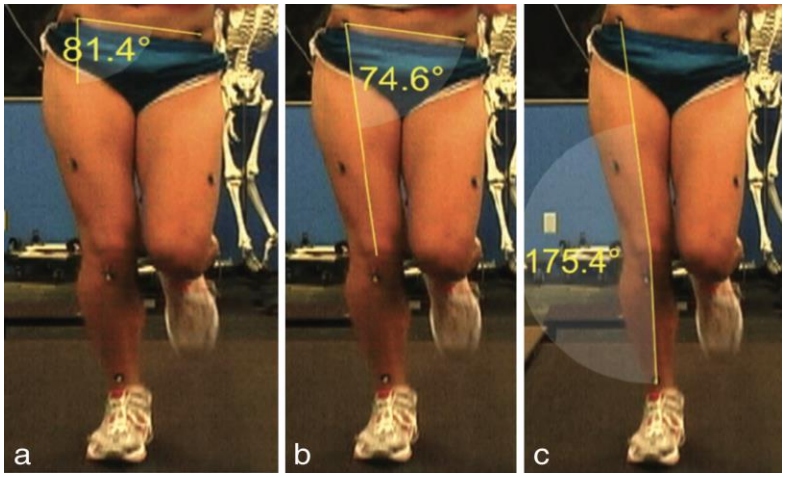

Maykut et al. (2015)