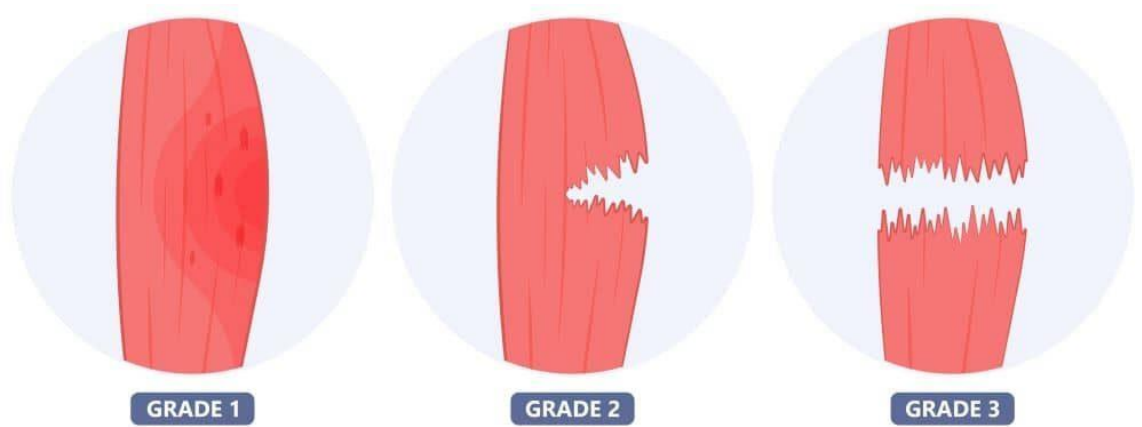




Early to intermediate Rehabilitation

Hamstring Tear

- ▶ This presentation will be focusing on a Hamstring Tear
- ▶ There are three Grades of a Hamstring tear ranging from a grade 1 up to a grade 3 tear
- ▶ In this presentation I will be focusing on a grade 3 tear



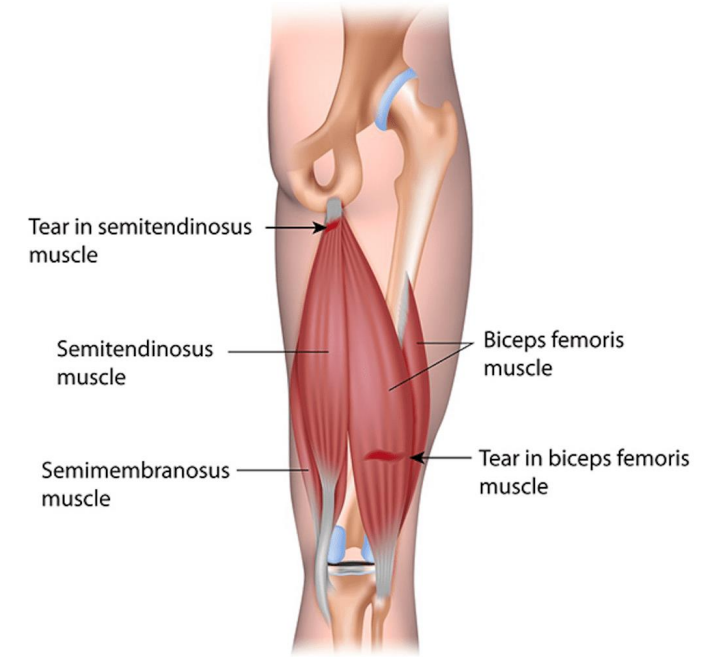
Location of Hamstring Tear

- ▶ When looking into hamstring tears you need to be aware that there are multiple muscles that can be torn
- ▶ Out of the 3 muscles in the hamstring the most common muscle to tear is the bicep femoris which is then followed by the semitendinosus (De Smet et al 2000)



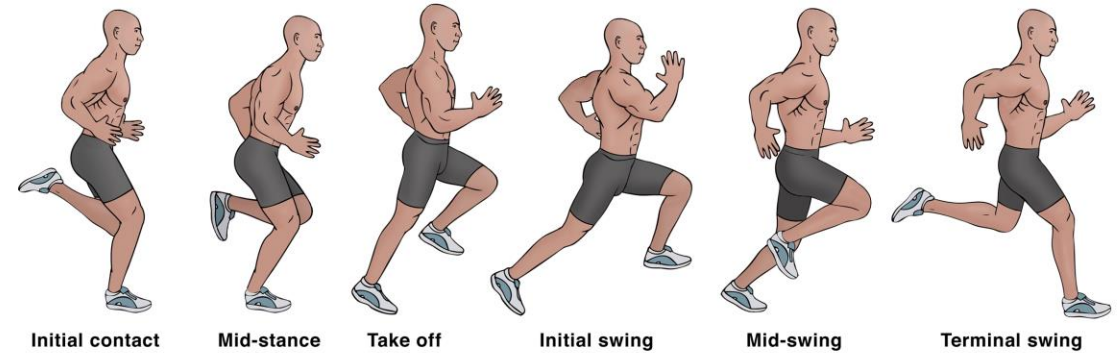
Grade 3 Hamstring Tear – Bicep Femoris

- ▶ A Grade 3 hamstring tear is when there is a complete rupture of the muscle
- ▶ When a Grade 3 hamstring tear happens it will be extremely painful for the person who has it
- ▶ A grade 3 tear will usually be shown by swelling , bruising and tenderness
- ▶ A complete rupture like this will also make it hard for people to walk and stop them from playing sport for up to 3 months



Mechanism Of Injury

- ▶ Hamstring Tears most commonly happen when there is Hip extension and knee full flexion
- ▶ Hamstring tears are very common in sprinting because of the muscle strain that is caused by the eccentric contraction at the end of the swing phase (Danielsson et al 2020)



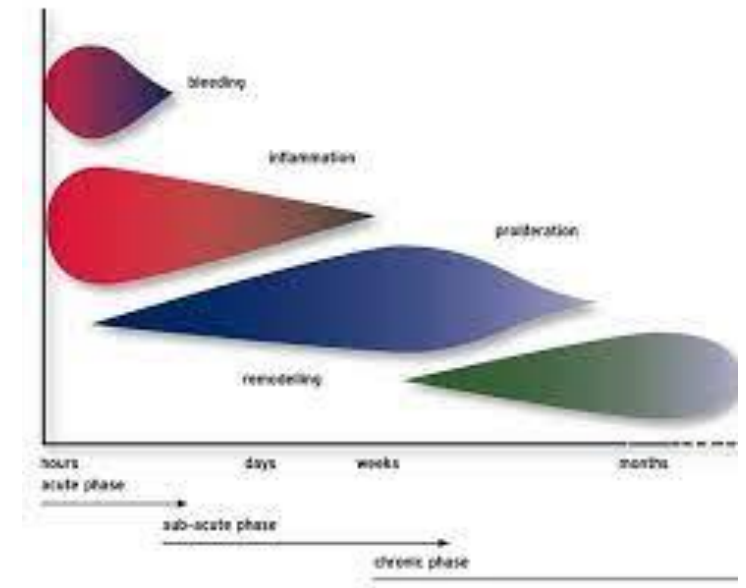
Where will you encounter the injury

- ▶ Hamstring Injuries are most commonly found while playing sports that include a lot of stop start and fast movements. These sports could include football, rugby and athletic events such as hurdles and sprinting (Mayo Clinic)



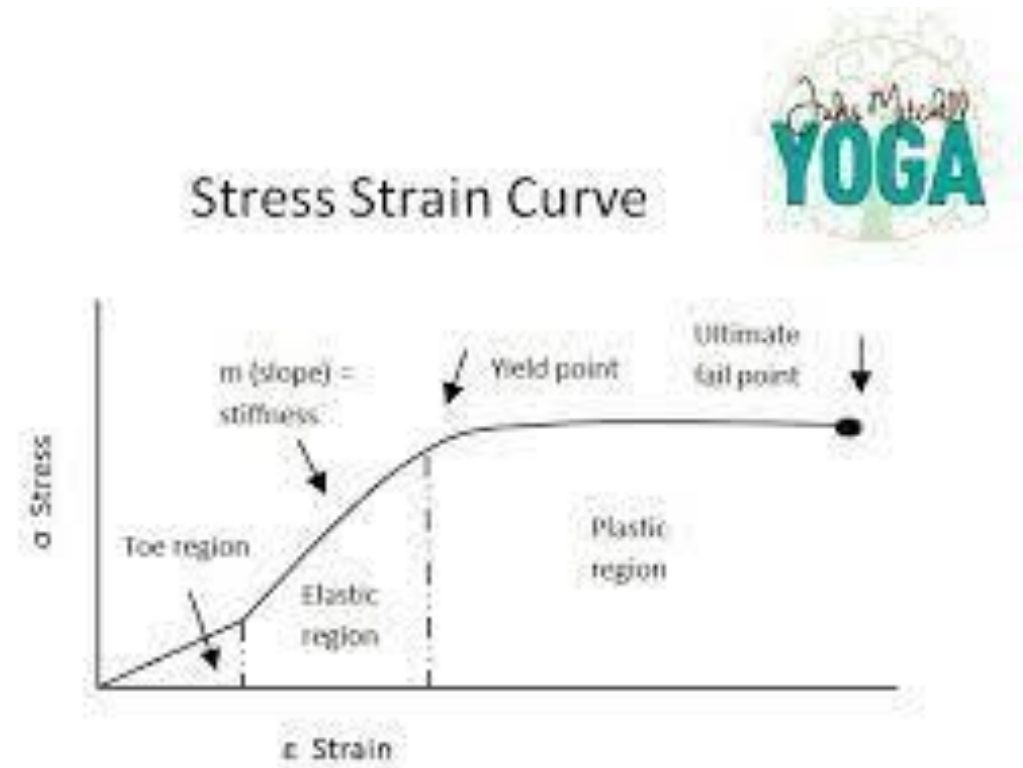
Tissue Healing

- ▶ There are three stages of muscle healing ' Destruction, Repair and Remodelling.' (Whittington 2017)
- ▶ Destruction Phase – This happens when the injury first appears and that leads into the inflammatory response which normally lasts 1-3 days (Watson 2006)
- ▶ Repair – In the repair phase collagen will start to form where the muscle tear happened trying to repair the muscle. This can last up to 6 weeks (Landen et al 2016)
- ▶ Remodelling Phase - During remodelling, the regenerating muscle fibres and connective tissue continue to mature and are being oriented into the final scar tissue (Whittington 2017)



Stress Strain Curve

- ▶ Stress strain curve shows why rehab is so important because without proper rehab after a tear the flexibility your muscle has can be affected and shorten if not treated correctly
- ▶ The plastic range shows why the muscle did tear because the muscle elongated past its end of range and rupturing



Rehabilitation's for Grade 3 Hamstring Tear

- ▶ Before starting a full rehab, plan people should wait until pain is gone from the injured leg this can normally take 3 weeks or more. This is important because by starting exercises too early you can re-injury or worsen the tear on the hamstring (Petruska)
- ▶ Once pain is gone the injured person can focus on the road back to recovery in the correct order :
- ▶ Range of Motion, Flexibility, Muscle Endurance, Strength, Coordination, Agility and then focus on sport specific training.

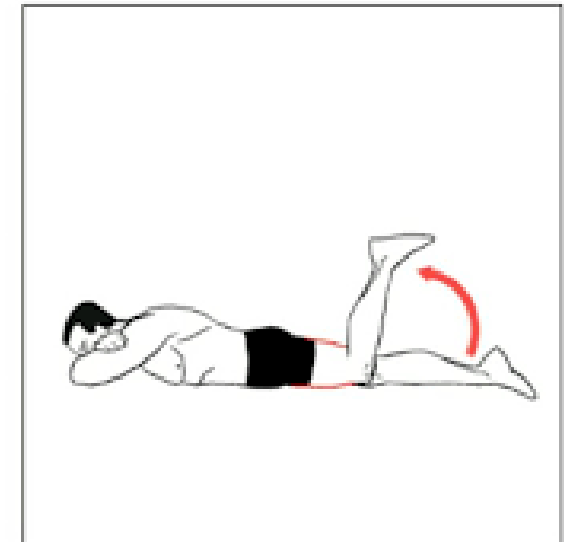
Process Of Healing

- ▶ When dealing with a grade 3 hamstring tear before you can start rehab you may have to look at other ways to start the healing process one of these is to use healing aids. Such as Crutches this can be effective for an injury because it can take weeks for the muscle to be able to bare weight
- ▶ For the first couple of weeks when the injury occurs the person may also use ice to help with pain in the hamstring and if there is any inflammation ice and compression can help with that



Rehab Exercises - Prone Knee Flexion

- ▶ Active knee flexion to improve range of motion and flexibility. For this exercise you would want to get 12-15 reps
- ▶ A regression for this exercise would be to hold an exercise band yourself and manually move yourself into knee flexion, to improve Range of motion and flexibility
- ▶ A progression to this exercise would be to attach an exercise band to an exercise machine and then use the resistance from the band to increase strength and muscle endurance by concentrically stretch the muscle



Straight leg Hold

- ▶ Straight leg raise, In this exercise you will lay on your back while using an exercise band to isometrically stretch the hamstring, you would want to hold this stretch for 30 seconds
- ▶ A regression for this exercise would be to use a wall to hold the injured leg in place flexing the hamstring while having a structure to hold it up
- ▶ A progression for this exercise would be to lay on an exercise ball to increase balance while doing the exercise



Straight leg Slide

- ▶ This exercise you use a slider on the and slide an outstretched leg up and down the wall to eccentrically stretch the hamstring. This would be for 10-12 reps for 3 sets
- ▶ A regression for this exercise could be to get someone such as a physio to bring the leg up and down this could be good in early rehab when just starting rehab exercises
- ▶ A progression for this exercise would be to use a football instead of the slider to improve balance and strength of the hamstring



Lunge

- ▶ Lunge, This is a good exercise which can be for later in the rehab plan when you are trying to improve flexibility and proprioception. For this you will want to do 10 –12 reps for 3 sets
- ▶ A progression for this would be to add an unstable surface under to injured limb. This will help to increase Co-ordination
- ▶ A regression For this exercise would be to hold onto a frame so that the injured limb does not have as much pressure of weight bared on it



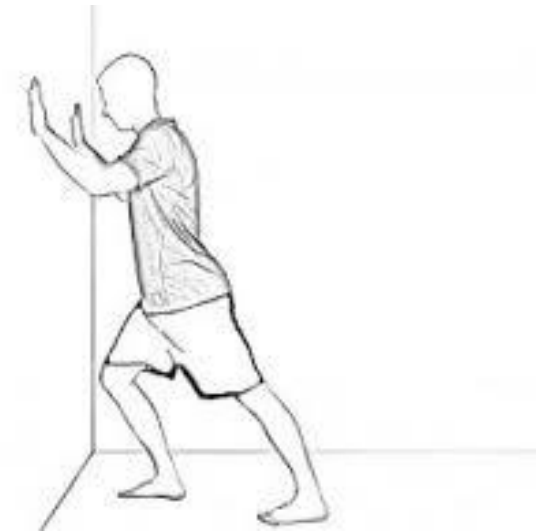
Reverse Hamstring Curls

- ▶ For this exercise you will be kneeled on the floor and then slowly fall down eccentrically loading the muscle. This exercise would be used near the end of the rehab when the muscle is close to full strength. 12 Reps – 3 sets
- ▶ A regression for this exercise would be to add a exercise band around your chest connected to a frame to decrease the load on the hamstring and adding stability
- ▶ A progression for this exercise would be to add a foam pad under your knees to try and improve stability and proprioception



Standing Calf Stretch

- ▶ This is an exercise where you put both hands on a wall with the injured leg straighten therefore eccentrically stretching the calf and hamstring . This would be held for 30 seconds
- ▶ A regression to this would be to sit on the floor with a exercise band over the top of the foot and then bring the foot into dorsiflexion
- ▶ A progression for this exercise would be to add an uneven surface under the injured leg to increase stability and balance



Sport Specific Rehab

- ▶ When coming to the final stage of rehab and the muscle is completely healed the person will then go into a rehab plan for their specific sport . This will include working with the team they are with and working to get back to full game fitness



Prevention of Deconditioning

- ▶ There are many ways to prevent deconditioning after injury the main way is to make sure the rehab plan correctly strengthens the injured muscle
- ▶ Isometric stretching can also help to stop deconditioning because you are holding a strain on a muscle and making sure to not lose flexibility as shown on the stress strain curve, this is because if you do not recover the flexibility you had before the injury the muscle is prone to more injuries and weaknesses

Importance of equal strength

- ▶ When completing a rehab plan it is important to use your uninjured limb as an objective marker
- ▶ This can help when doing weighted training trying to match the reps you do with the uninjured and injured limb, when they become equal it is a good indicator of recovery
- ▶ Others ways you can prevent deconditioning are 'physical therapy, maintenance of nutrition, medical management' (NHS)

Surgery

- ▶ Surgery is not always needed for a hamstring tear. It would be needed if the tendon is torn completely off the bone and needing reattachment
- ▶ Surgery for the reattachment can take up to 6 months before being able to start to build the range of motion. Reattachment typically takes at least 6 months, due to the severity of the injury.



Bibliography

► Reference list

- aidyourhamstring.com. (n.d.). *Hamstring Post Surgery Rehabilitation*. [online] Available at: <https://aidyourhamstring.com/hamstring/hamstring-surgery-rehabilitation.php#:~:text=How%20long%20will%20it%20take> [Accessed 22 Jan. 2024].
- Anon, (n.d.). *Preventing deconditioning while at home – The Ehlers-Danlos Support UK*. [online] Available at: [https://www.ehlers-danlos.org/information/preventing-deconditioning-while-at-home/#:~:text=Doing%20static%20\(isometric\)%20exercises%20can](https://www.ehlers-danlos.org/information/preventing-deconditioning-while-at-home/#:~:text=Doing%20static%20(isometric)%20exercises%20can) [Accessed 22 Jan. 2024].
- CMTPT, B.W., PT, DPT (2017). *Understanding the 3 Phases of Muscle Healing*. [online] Athletico. Available at: <https://www.athletico.com/2017/03/27/understanding-the-3-phases-of-muscle-healing/#:~:text=With%20such%20a%20prevalence%20of> [Accessed 22 Jan. 2024].
- Danielsson, A., Horvath, A., Senorski, C., Alentorn-Geli, E., Garrett, W.E., Cugat, R., Samuelsson, K. and Hamrin Senorski, E. (2020). The mechanism of hamstring injuries – a systematic review. *BMC Musculoskeletal Disorders*, 21(1). doi:<https://doi.org/10.1186/s12891-020-03658-8>.
- De Smet, A.A. and Best, T.M. (2000). MR Imaging of the Distribution and Location of Acute Hamstring Injuries in Athletes. *American Journal of Roentgenology*, 174(2), pp.393–399. doi:<https://doi.org/10.2214/ajr.174.2.1740393>.
- Fixit Physiotherapy and Training. (n.d.). *Pulled Muscle Recovery Times — Fixit Physio Belfast*. [online] Available at: <https://www.fixitphysio.com/blog/pulled-muscle-recovery-times#:~:text=Muscle%20healing%20starts%20with%20an> [Accessed 22 Jan. 2024].
- Landén, N.X., Li, D. and Ståhle, M. (2016). Transition from inflammation to proliferation: a critical step during wound healing. *Cellular and Molecular Life Sciences*, [online] 73(20), pp.3861–3885. doi:<https://doi.org/10.1007/s00018-016-2268-0>.
- Mayo Clinic. (n.d.). *Hamstring injury - Symptoms and causes*. [online] Available at: <https://www.mayoclinic.org/diseases-conditions/hamstring-injury/symptoms-causes/syc-20372985#:~:text=A%20hamstring%20injury%20involves%20straining>.
- Petruska, A. (n.d.). *Hamstring Strain*. [online] Available at: https://www.bostonsportsmedicine.com/pdf/protocols/hamstring_strain.pdf.
- www.england.nhs.uk. (n.d.). *NHS England» Time to move: Get up, get dressed, keep moving*. [online] Available at: <https://www.england.nhs.uk/blog/amit-arora/#:~:text=Preventing%20Deconditioning%20Syndrome%20requires%20a>.