

Irish Dance

wigs and jigs...bumps and boots

MDMF



Betsy Hines, DPT, ATC, TCRG

Purpose: Summary of the biomechanics of Irish dance and common injuries

MDMF

Betsy Hines, DPT, ATC, TCRG; a little about me...

- Dancing since the age of 3
- Irish dancing since age 12
- First major Irish dance injury at the age of 14
- It is why I chose Physical Therapy as a profession
- 10 boots, one ambulance, one surgery later...

MDMF

Now I teach!



MDMF

A brief history...

- Dancing masters would travel from village to village, staying for weeks, instructing individuals how to dance. They were colorful characters, and highly respected and anticipated.
- Competitive Irish dance dates back to the 1800's when the Gaelic League strived to preserve and strengthen the Irish culture
- An Coimisiun competitive organization was founded in the 1920's which established qualifications for teachers and adjudicators (aka TCRG, ADCRG)
- Irish dance was made wildly popular in 1995 by the premiere of *Riverdance* on Eurovision

MDMF

Irish Dance today

MDMF

- Irish dance has since evolved, there are Irish dance schools on every continent, and thousands of dancers gather each year for the World Irish dance championships
- *per the clrg website* "Focused primarily on footwork, Irish dancing is performed either individually (step dancing) or by teams (céilí and set dancing), and accompanied by traditional Irish music played on a variety of instruments, such as accordion, piano, fiddle, flute or banjo."

Biomechanics of Irish Dance

- Irish dance basic form is a rigid upper body, adduction and external rotation at the hips, full extension at the knees and Demi pointe of the ankle. There is no plié allowed when landing from Irish dance jumps



MDMF

Biomechanics of Irish Dance

- This is contrary to other forms of dance, and athletics which engage the core and lower trunk for jumping



MDMF

Biomechanics of Irish Dance

- Coventry University Study (Shippen, JM and May B JDMS 2010)
 - Measured ground reaction forces of Irish dancers with basic movements, in particular a rock step
 - Max ground reaction force to the body was 4.5 times the dancers body weight
 - Contact force at the ankle was 14x body weight, mostly by muscle force

MDMF



- Irish Dance involves jumping mechanics directly opposite that of proper landing mechanics for the lower extremity
- Improper mechanics = Inc risk for injury

MDMF

Irish Dance Training Schedule



MDMF

Irish Dance Training Schedule

MDMF

- Highly variable: As low as one, 45-60 min class per week for beginners, as high as 4-5 nights a week 2-3 hours at a time for championship level.
- Length of time: 45 minutes to 4 hours a day leading up to major competition

Irish Dance Training Schedule MDMF

- Dancers qualify for higher levels by placing at competitions.
- Higher levels are associated with more complex steps, tricks, and rhythms.
- Young dancers who place well at competition early on will learn highly complex steps prior to, or during their adolescent growth spurt.
 - occurs with a significant jump in the number of hours of lessons per week.



- Irish Dance training schedule at a relatively high volume all year
- Lack of rest = Inc risk for injury

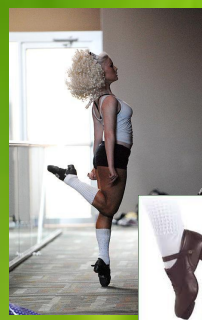
MDMF

Shoewear MDMF



- Softshoes aka "ghilles" are comprised of a leather sole held to the foot by tight lacing
- A very tight fit accentuates the movement/line of the foot

Shoe Wear



- Hard shoes are a leather upper, soft shank and a fiberglass heel and tip in order to achieve "toestand" or pointe like position
- The leather stretches, so these are bought quite small, and "broken in" to fit the dancer's foot



- Ill fitting shoes at a high volume throughout the year
- Poor footwear = Inc risk for injury

Summary...

- Irish dance has its faults which place dancers at risk for injury and time loss from training, competing and performing



MDMF

Injury Incidence

MDMF

- MCW study "Injury Patterns in Female Irish Dancers"

(Megan Noon, MD, Anne Z. Hoch, DO, Laura McNamara, BS, Jane Schimke, AAS)

- 1) Stress Fractures (29.9%)
- 2) PFP (11.1%)
- 3) Sever's Disease (6.0%)
- 4) Ankle Sprains (5.1%)
- 5) Plantar Fasciitis (*FHL Tenosynovitis) (4.6%)
- 80% of dancers had multiple injuries

Patellofemoral Pain Syndrome

MDMF

- Causes/Risk Factors
 - Adolescent growth spurt
 - Forced turn out
 - Decreased glute strength
 - Increased volume of training in a short amount of time

Patellafemoral Pain: Forced Turn out

- Proper turn out should be initiated from the hips and midpoint of patella in line with second toe
- Some Irish dance teachers instruct how they are trained, and teach by "look" rather than form.
- Turned out feet are key for high scores, dancers will force this at all costs

MDMF

Patellafemoral Pain: Turn out

Look at a dancer in parallel and 1st position

- watch how they initiate their movement
- check for increased lumbar lordosis with movement into turnout

MDMF

Patellafemoral Pain: Turn out



MDMF

Patellafemoral Pain: Turn out



MDMF

Symptoms

MDMF

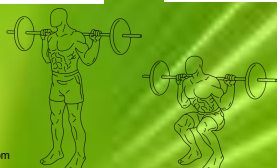
- Medial or anterior knee pain after activity, which begins to persist during rest
- Pain with going up and down stairs
- Tenderness along medial structures of the knee, may or may not have swelling
- Dancer is experiencing adolescent growth spurt

Treatment

MDMF

- RICE
- Education on length of time spent in turn out
- Neuromuscular re-education
 - initiate turn out from hips
 - re-training for daily activities (steps, squats)
- Strengthening of glutes and stretching of the hip to improve external rotation mobility if needed

Glute Strengthening for PFP



source: goodexercise.com

MDMF

Sever's Disease

- Apophysitis of the calcaneal growth plate due to repetitive trauma
- Left to persist or untreated, dancers will form a Haglund's deformity, or bony prominence on the posterior heel

MDMF

Sever's Disease sign/symptom

- Dancers at risk are those training at high levels during their adolescent growth spurt
 - Young dancers who progress quickly and learn advanced skills without strength development
- Heel pain during and after dance
- Tight heel cords
- Swelling and tenderness along achilles, calcaneus, and retrocalcaneal bursa

MDMF

Sever's Disease

- In the skeletally mature Irish dancer, pain will present as an achilles tendinopathy
- The symptoms are similar, but the tendon will be the pain generating tissue, versus the apophysis

MDMF

Treatment for Achilles/Sever's

- Rest: Especially important in the adolescent dancer
- Ice
- Heel cord stretching in a closed chain position to decrease traction on achilles from calcaneus
- Soft tissue mobilization
- Proper footwear when not dancing, immobilization may be necessary if sx are advanced



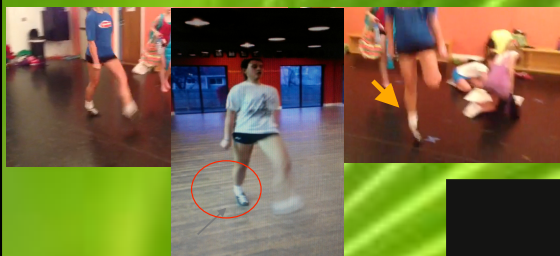
MDMF

Achilles/Sever's

- Additional Notes:
 - Avoid eccentric heel raise protocol in the skeletally immature
 - Rule out symptomatic Os trigonum with imaging
- In a skeletally mature dancer, eccentric heel raise protocol may be beneficial for pain relief

MDMF

Name that Injury



MDMF

Stress Fracture



MDMF

Stress Fracture: Training is greater than rest

- Little variety in types of movement
 - Hours of training at a time
 - teams to solos to choreography
- Stress or mechanical load to a bone exceeds a bone's capacity to recover/repair

MDMF

Stress Fractures

- Irish dancers are prohibited from plie with landing
- Tight fitting shoes without proper cushion
- Hard training surfaces (garage, basement)
- Improper nutrition
- Rapid increase in class/practice

MDMF

Stress Fracture Signs/Symptoms

- Relevant history
 - Ask questions about volume, training surface, etc
 - Ask what they are training for?
- Tenderness along a bony region which localizes over several weeks
- Bump/localized swelling

MDMF

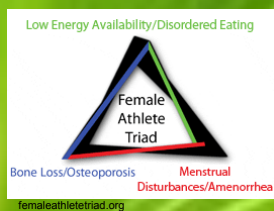
High Risk Stress Fractures

- Navicular: Poor vascularity, delayed healing
- Tibial Crest: dreaded black line
 - constant tension load on bone, increases with jumping
- Common To Irish Dance:
 - Sesamoid
 - Metatarsal
 - Fibula

MDMF

Stress Fracture: Female Athlete Triad

- Decreased caloric intake
- Disturbance of menstrual cycle
- Decreased bone nutrition, leads to fractures



MDMF

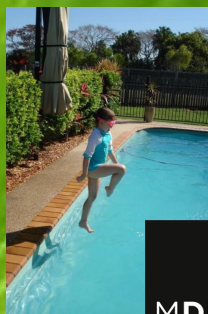
Stress Fractures- Treatment

MDMF

- REST: Minimum 4-6 weeks, until tenderness has resolved and/or imaging demonstrates healing
- Immobilization of affected area is important to allow bone remodeling and healing
- Stress injuries may be treated by relative rest
 - Dancing in sneakers
 - Monitoring sx to avoid progression to stress fracture

Stress Fractures- Treatment

- Dancers may cross train with biking and swimming if tolerated
- Core strengthening and neuro-re-ed may be helpful in order to maintain proximal strength and improve proprioception



MDMF

Stress Fractures- Treatment

- 80% of Irish dancers sustained a repeat injury per MCW study
- Educate dancers and parents about proper training volumes after injury
- Address nutrition and proper rest periods with dancer and parents, especially of risk factors for the Triad are apparent

MDMF

FHL Tenosynovitis “dancer’s feet”

- Not included in the MCW incidence study, however frequently seen in clinic
- Inflammation of the tendon sheath



MDMF

FHL Tenosynovitis

MDMF

- Can mimic symptoms similar to plantar fasciitis, achilles tendinopathy, or sesamoiditis
- Pain along longitudinal arch and plantar foot
- Pain with resisted great toe flexion
- Pain with DF and great toe ext
 - Functional hallux rigidus: limited great toe ext in a DF and 1st MTP DF position

FHL Tenosynovitis treatment

- Relative rest: decreasing volume of training, and avoiding painful activities
- Supportive shoe wear
 - sneakers during dance, and encouraging shoes with proper support during the day
- Immobilization as needed to decrease inflammation
- Soft tissue mobilization
- Intrinsic strengthening, and glute/core strengthening

MDMF

Dance Special Tests

Plantar Flexion test (Harkness Center for Dance Injuries, NYC)

- Determines if dancer has adequate plantar flexion to go en pointe (Irish dance Toe stand)
- + if there is not space below ant talus

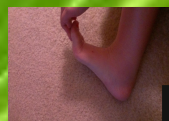
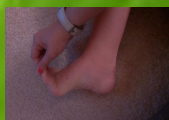


MDMF

Dance Special Tests

Functional Hallux Rigidus: FHL tenosynovitis

- Dorsiflex Great toe
- Dorsiflex Ankle
- + test is if a flexible 1st MTP becomes rigid
- - test is if 1st MTP maintains motion through ankle ROM



MDMF

Additional Notes

- The adult Irish Dancer
 - If the above pathologies are not properly treated, places the dancer at increased risk for chronic ankle instability, and early OA throughout the foot and ankle
- Education is key
 - The competitive Irish dancer will NOT want to rest, education, and modification may be helpful for the dancer to have ownership over their injury
- Triad risk factors
 - Be aware, and refer as necessary to address barriers to the dancer beyond the injury

MDMF

Thank you!

Betsy Hines
betsy@mindancemed.org

