




Accelerated ACL Rehabilitation



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Purpose

- 20 minute overview of one accelerated ACL rehabilitation technique
- Not intended to create a debate over theories or practices
 - Due to time constraints
- Will challenge current models and practices

Objectives

- Background on Dr. Shelbourne
- Shelbourne-based rehabilitation protocol
- Rehabilitation considerations

Dr. Shelbourne

- Practicing since 1982 with a knee only focus
- Currently limits practice to ACL repair, simple scopes, and realignments.
- Reports a patient profile of “>50% young athletes”
- Over 80 publications as primary author (knee related)
- Holds patent on the cryo-cuff



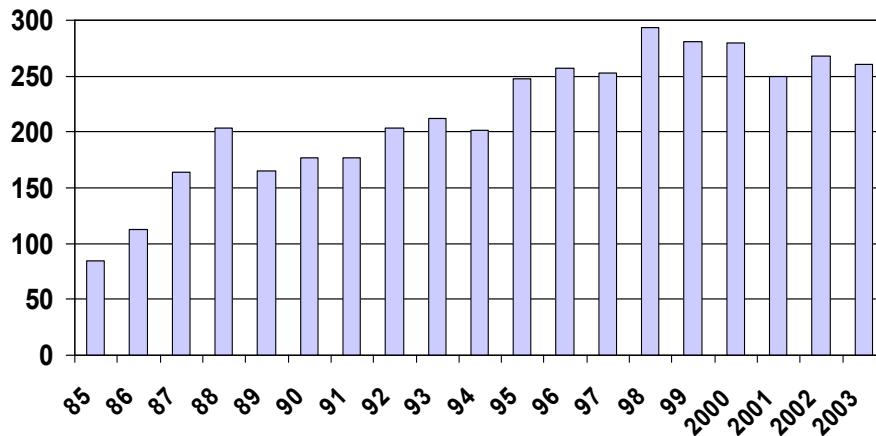
K Donald Shelbourne MD

Dr. Shelbourne

- Claims that most physicians tend to focus on the surgical technique
 - States “rehabilitation is an afterthought... left to the physical therapist/athletic trainer to figure out”
- Demands a long term follow up of patients
 - Employs ~4 FTE researchers
- Performs all rehabilitation in-house
 - Employs 5 PTs and/or ATCs

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Shelbourne’s # of ACL/yr



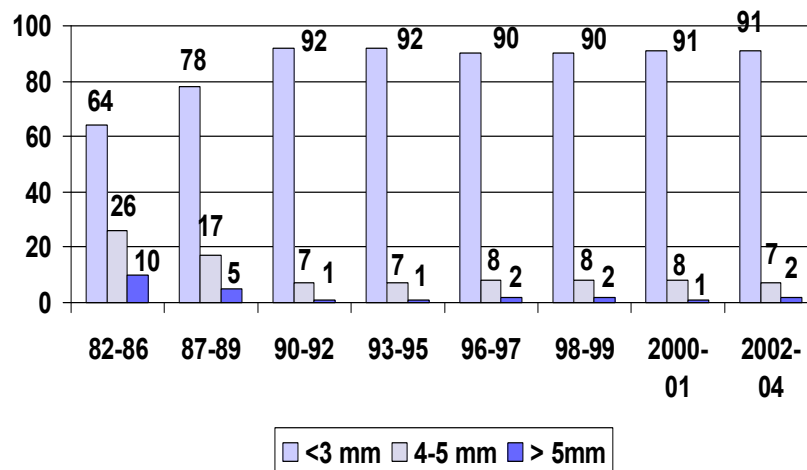
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Shelbourne Surgical Technique

- Mini-Arthrotomy
 - “For optimal graft placement”
 - Has always used this technique, to maintain comparability of data
 - Has allow rehabilitation to be the dependent variable in outcome
 - Button fixation
 - “Prevents overtensioning”
 - “Allows tight bone-fit”
- Utilizes a contralateral donor graft, exclusively
 - Strong graft, allows B2B healing
 - Claims it “allows for early return to sports”

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Shelbourne KT Values (%)



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Shelbourne's Goals of Surgery

- Reach symmetry between knees
 - Range of Motion
 - Strength
 - Stability
 - Overall Function
- Would rather have two knees @ 90% of preop levels than a 100%/70% split of preop levels

Symmetry

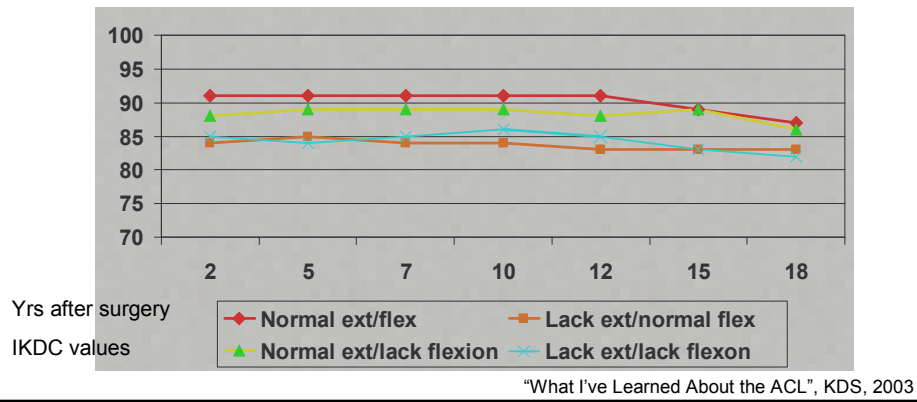
- “Symmetry is also necessary for all patients to be able to do normal every day activities comfortably (stairs, squatting)”
- “Many patients have a stable knee but never achieve knee symmetry, and yet they are told they have a good result”
- “All these issues are a problem in some way, regardless of the graft source”

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Emphasize Full Extension/Hyperextension

Normal extension is defined by the normal knee preop levels

Aggressive use of extension exercises to return normal extension values



Elite Seat for Extension Block



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Rehabilitation Protocol

- Calls into question the notion of graft strength timelines
 - Idea that graft is strong/weaker depending on point in time; related to vascularization
- Protocol is built on criteria based progression rather than time based progression.



Rehabilitation Protocol

- Shelbourne claims it now models many things he told his patients not to do, they did anyways, and still got better
- Results in 1wk, 2wk, 4wk, 8wk, 12wk, PRN follow up visits / rehabilitation sessions
- Relies on patients to follow guidelines and perform exercises at home
- Allows patients to make decisions regarding what they can and cannot do; with advisement

Rehabilitation Cascade of Events

Pre-op rehab: No swelling, full ROM, good leg control

Surgery: Full ROM after graft placement and fixation

Post-op--Full ROM and no swelling

Increase leg strength

Proprioception and agility drills

Sport-specific drills

Competition

Conflicting goals

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Preop/Postop

Pre-Op

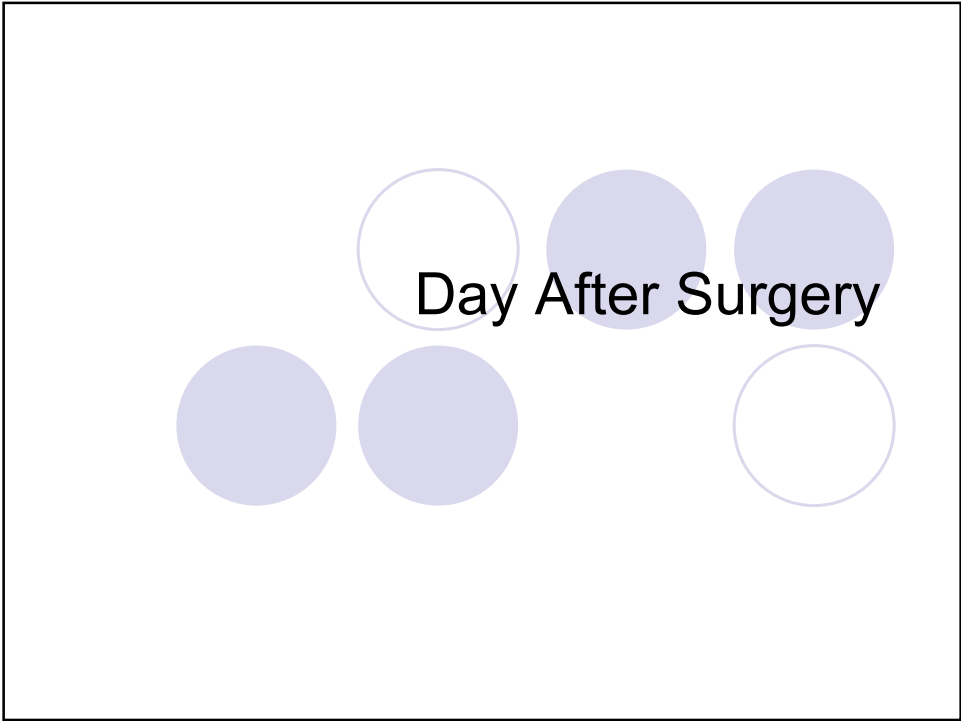
- Patient Education
- Heel Slides
- Towel-Toe Pull/Hyperextension
- Quad Sets
- Straight Leg Raises



Post-Op



- Compression & Cold to prevent hemarthrosis
- CPM provides elevation & gently maintains available ROM
- Patients kept for a 23hr stay



Day after surgery

- Minimal swelling

A photograph showing a close-up of a patient's forearm. A white medical bandage is wrapped around the lower part of the arm. The skin above the bandage appears slightly red and swollen, consistent with the 'Minimal swelling' description.

Day after surgery

- Normal Hyperextension



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Day after surgery

- Good terminal extension, actively



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Day after surgery

- Flexion measured by patient using a yardstick
- Excellent self-assessment tool
 - Helps when patients call w/ ?



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Day after surgery

- Good leg control



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Day after surgery

- Walking for bathroom privileges

No Nerve Block

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Discharge day to day 5

5 days of bed rest

1d-5d s/p ALC-r

- Bedrest except for bathroom privileges
- Heel prop extension exercises 10 min 6x/day
- Flexion exercises 6x/day
- SLR
- Quad Sets
- CPM & Cryo/Cuff worn continually except during exercises

First 5 days at home

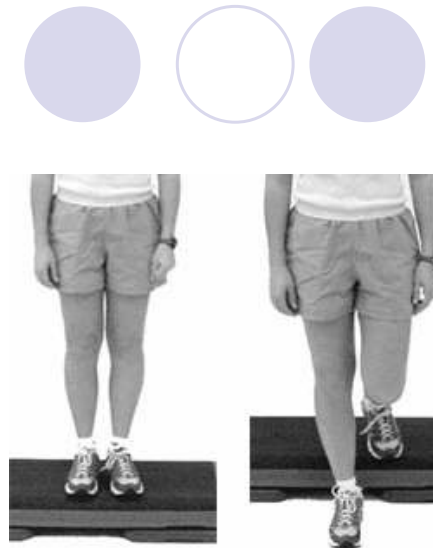
- Knee needs a period of rest, elevation, and cold/compression to prevent a hemarthrosis
- Without a hemarthrosis –
 - Obtaining full ROM is easier when the knee does not have an effusion
 - Knee is less painful
 - Quad control can be obtained easier

1st Post-op Visit 1 Week After Surgery



1 week post-op

- If patient has been compliant, Minimal effusion will be present, ROM will be excellent, and NM control is acceptable
- Transition Exercises were possible
 - Heel slides → wall slides
 - QS/SLR → Step Downs/SAQ



1 week post-op

- Can return to daily activities
- Use of cryo/cuff after exercises
- Emphasis of a normal gait
- Monitor swelling
 - Adjust activities where needed to prevent swelling
- Return of normal flexion/extension values emphasized

2nd Post-op Visit
2 weeks after surgery

2 weeks Post-Op

- Instructions:

- Maintain full hyperextension
- Increase flexion
- Emphasize a normal gait pattern
- High repetition exercise for graft-donor site
- Use Cryo/Cuff after exercise
- Can return to daily activities
- Monitor swelling and adjust activities to keep swelling to a minimum

2 weeks Post-op

- ROM should exceed 125 degrees
 - If >125, no longer a primary emphasis
- Progress strength
 - Increase step height
 - Long Arc Quads
 - Bench Hamstrings
- Increase proprioceptive challenges



3rd Post-op Visit
4th week after surgery

4 weeks post-op

- By 4 weeks, ROM should be normal or near-normal
 - Patient must be able to sit on heels to progress
 - Sitting on heels will remain a test prior to activity



4 weeks post-op

- ADLs should pose no challenge
- Patient has prerequisite strength to begin formal strength training
- Patients who advance quickly may be able to begin basic sport-specific drills
- Rules for new activity: No pain during or after activity, No increase in swelling, No altering of gait

Possible Exercises

- All high rep, low weight, initially
- Commonly include:
 - Leg press
 - HS Curl
 - 4-Way hip
 - SL Proprioception (i.e. Stork)
- May Include:
 - Slow/Light plyometrics
 - Basic sports skills (i.e., soccer = dribble, short kick)



4 – 8 weeks after surgery

- Patient instructions for next 4 weeks
 - Additional strengthening with weights – single leg exercises
 - Begin functional agility program
 - Sport-specific agility drills
 - Light controlled sport-specific drills
- If an athlete, may utilize ATC at home facility
- If no on-site ATC, support provided via email and phone



4th Post-op Visit
~8 weeks after surgery

8 weeks post-op

- If strength is around 70 to 80% (of normal knee pre-op), then begin more intense functional work
- Every other day to allow period of rest
- Specific functional activity to increase strength
 - Example – controlled jumping drills in basketball (rebounding, jump shot)
 - May need to do every other day, depending in soreness in tendon
 - Continue with weight training
- Keep it specific to the patient!

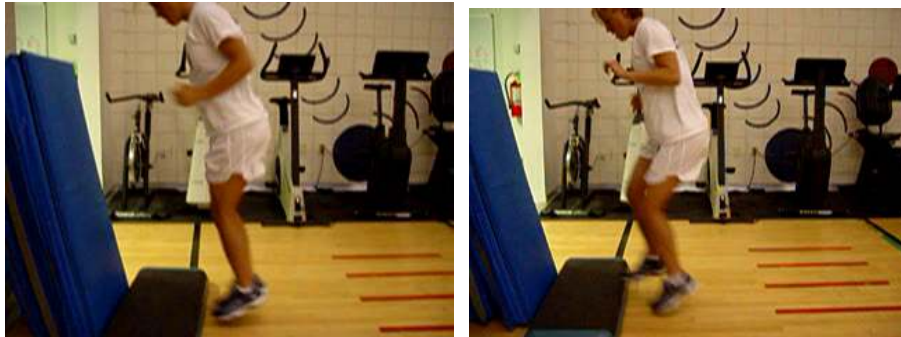
8 week potential



8 week potential



8 week potential



8 week potential

8 weeks
Post op
R ACL / L PTG
Agility Running

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2-4 months after surgery

- Continue to progress strength
- Continually adapt sport-specific drills to more closely resemble actual sport
- When able to perform drills in a controlled environment, reintroduce to actual practices
- When able to practice without difficulty, reintroduce to game situations
- Remember, No pain, swelling, or altered gait

4 month potential

R ACL-LG
4 months post-op
Purdue vs Iowa

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Important Note

- Use Objective Feedback
 - Isometric Leg Press w/ tensiometer
 - 1,2,4,8,12
 - Biodex when capable
 - 4,8,12
 - 3PQ; Leg Press Force Place
 - 4,8,12





Rehabilitation Considerations

- If you try to do aggressive strengthening immediately after ACL reconstruction, the knee will become swollen, stiff, and painful
- So it is best to wait until full ROM has been obtained before the patient begins aggressive strengthening

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Rehabilitation Considerations

- Even then, when doing strengthening exercises, ROM must be monitored daily to make sure the knee is not losing motion
- Patient's highest function will be at the level of the worst knee/leg
- Must obtain symmetry with ROM and strength for function to be totally normal


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Summary

- Regardless of graft source, proper and complete pre-op and post-op rehabilitation is necessary
- Patient must go through a progression of steps to achieve an optimum result
- Full symmetrical ROM is required to obtain the best long-term result
- Obtaining full symmetrical ROM, strength, and function is possible

"What I've Learned About the ACL", KDS, 2003

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- This presentation was created based on oral & written communications with Dr. K Donald Shelborne. It also incorporate much information found on a powerpoint authored by Dr. Shelbourne, entitled "What I've Learned About the ACL", 2003 version.
 - For more information regarding Dr. Shelbourne's techniques or practice, please visit: www.aclmd.com



- Questions are welcomed at:

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