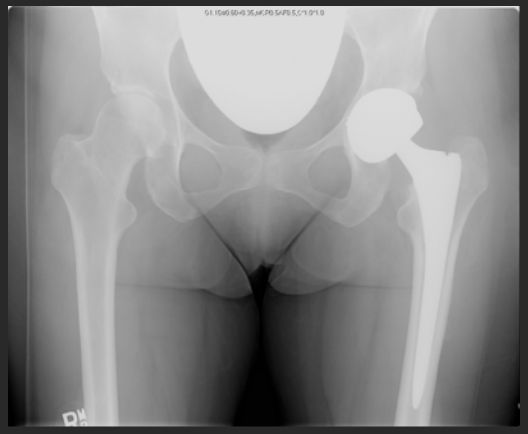
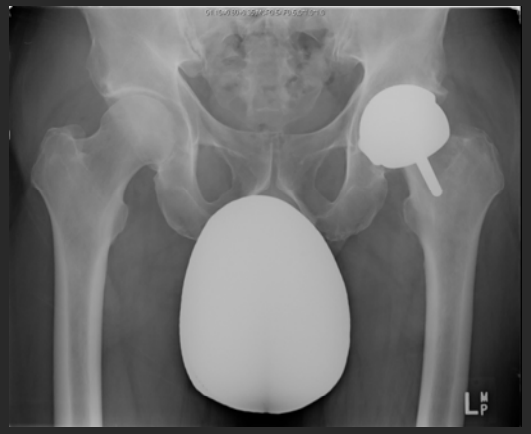
Total Hip Arthroplasty





Presented by : Frank Filice (PT)
London Health Sciences Centre

June 20, 2008

Purpose

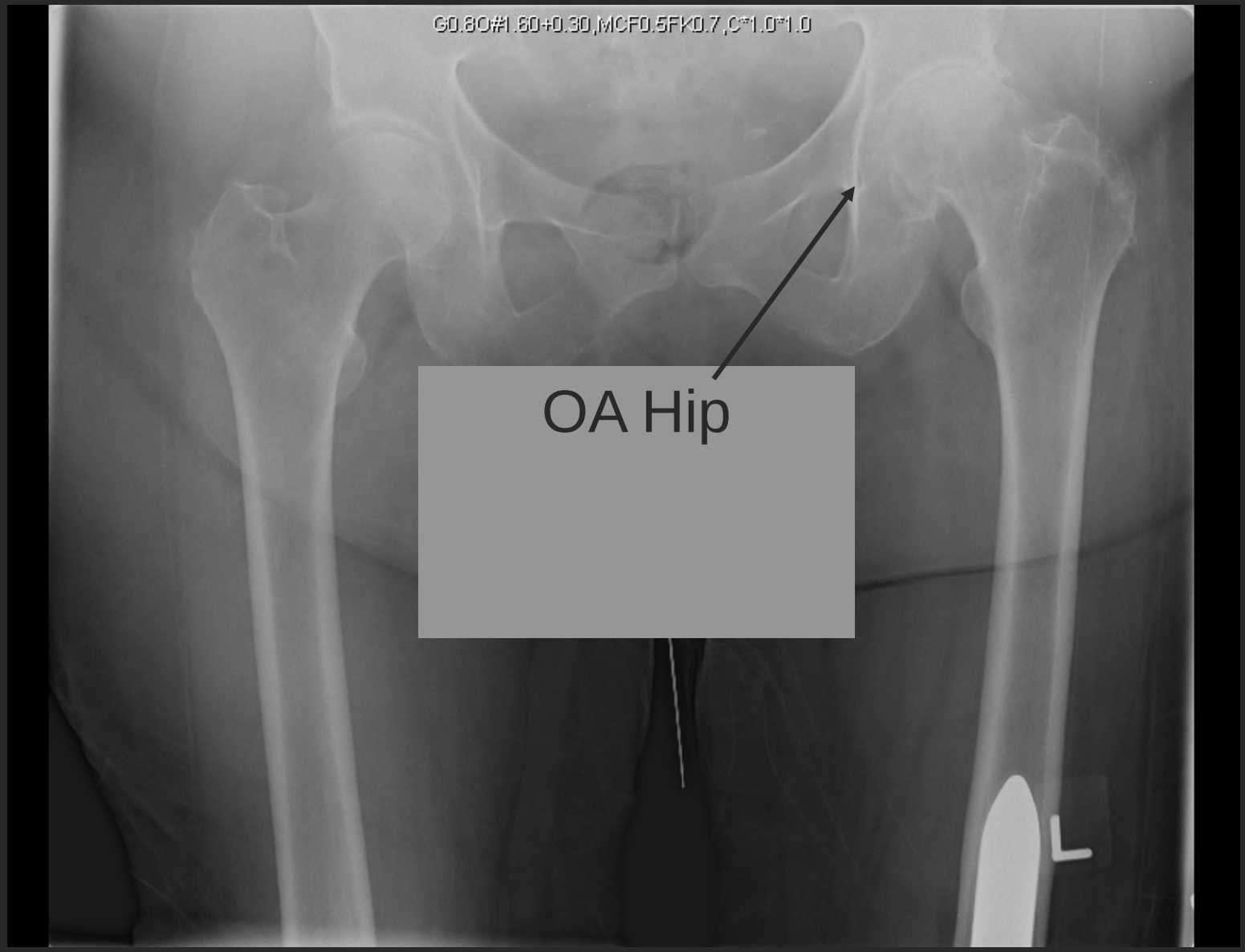
- Provide information that explains the rationale for the post-op precautions.

- Provide some general guidelines for post-operative care.

Presentation Overview

1. THA – types and applications
2. Surgical Approaches
3. Dislocation
4. Considerations for post-operative care
5. Post-operative management

Osteoarthritic hip



Total Hip Arthroplasty

Total Hip Arthroplasty is a term that includes a number of different joint prostheses.

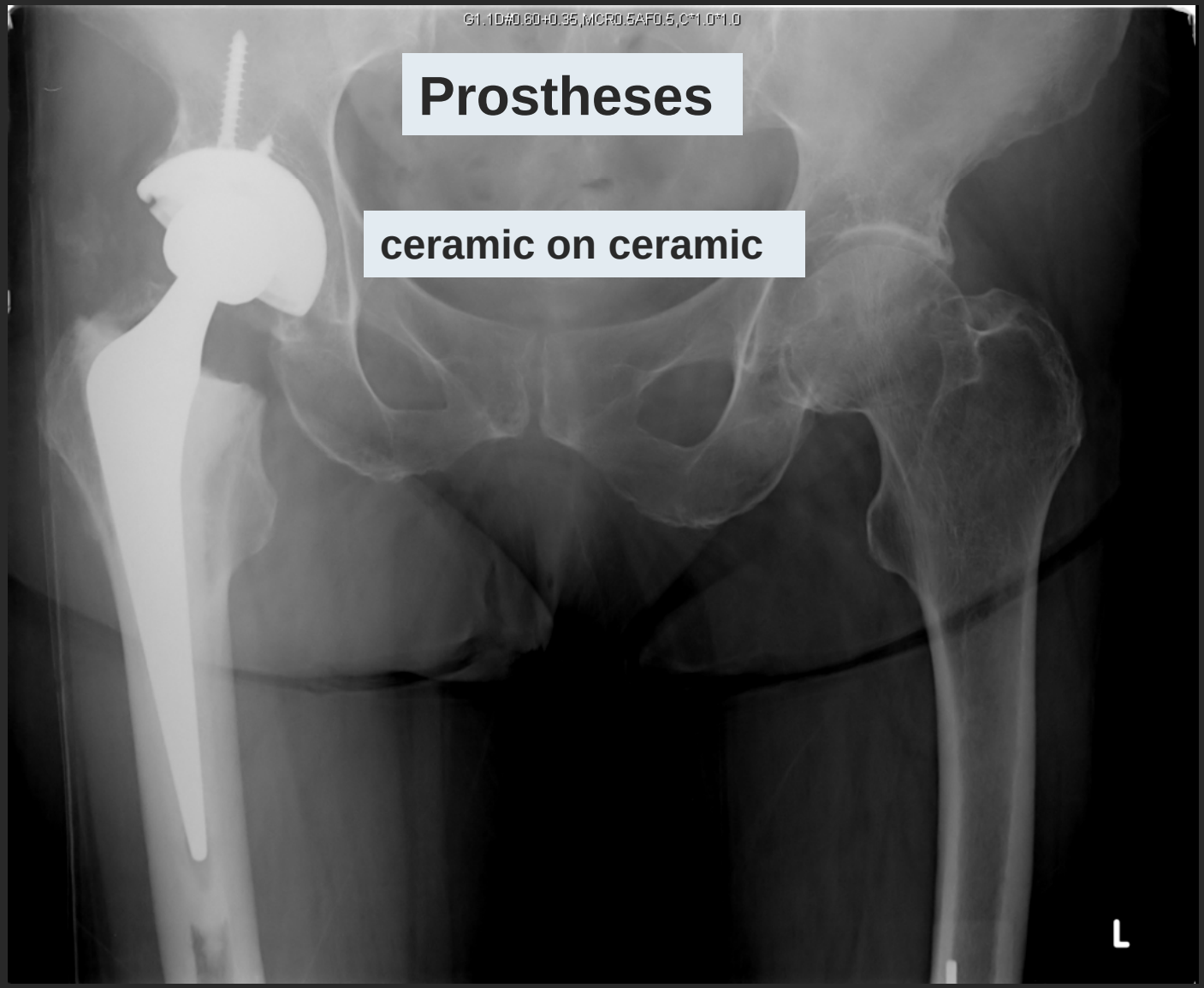
1. Standard Total Hip Arthroplasty

2. Bipolar Hemiarthroplasty

3. Birmingham Hip Resurfacing

4. Modified Standard THA

1. Standard THA



1.Standard THA

A. Metal on Plastic

Description

- metal head articulating with plastic acetabular component
- femoral head diameter b/w 28-32 mm
- cemented or uncemented

Target Population

- most common

Advantages/Disadvantages

- No risk of producing metal ions
- polyethylene wear – particles can induce osteolysis

1.Standard THA

B. Metal on Metal

Description

- metal head articulating with metal acetabular component
- femoral head diameter b/w 28-32 mm
- cemented or uncemented

Target Population

- generally males
- not used on women of childbearing age, or on individuals with known Ca or renal disease

Advantages/Disadvantages

- improved wear
- production of metal ions

1.Standard THA

C. Ceramic on Ceramic

Description

- ceramic head articulating with ceramic acetabular component
- Somewhat larger femoral head (36 + mm)
- cemented or uncemented

Target Population

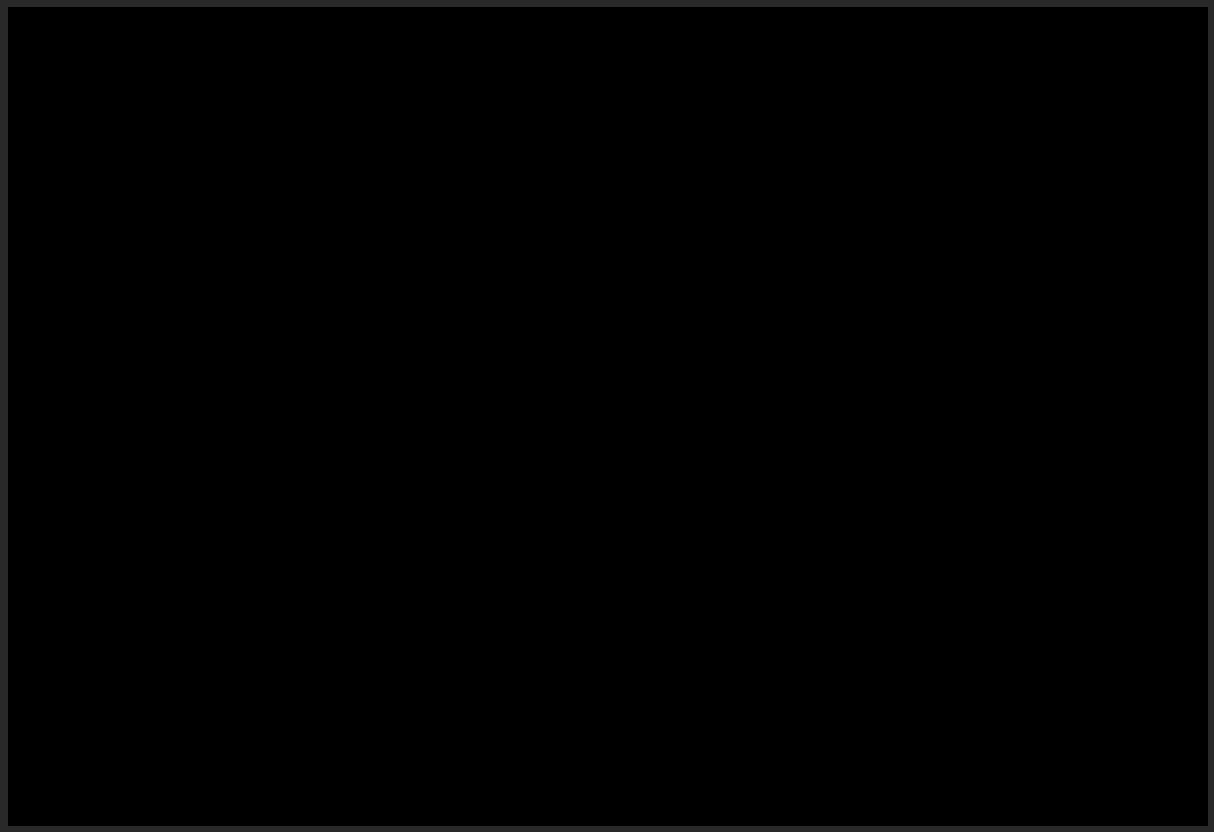
- Most commonly used in younger females

Advantages/Disadvantages

- no risk of producing metal ions
- more stable because of larger head
- greater risk of fracturing compared to metal components
- can be noisy

Standard THA

Ceramic on Ceramic



2.Bipolar Hemiarthroplasty

Description

- two articulating surfaces, small ball within the larger femoral head which articulates with the acetabulum
- no acetabular component
- generally cemented

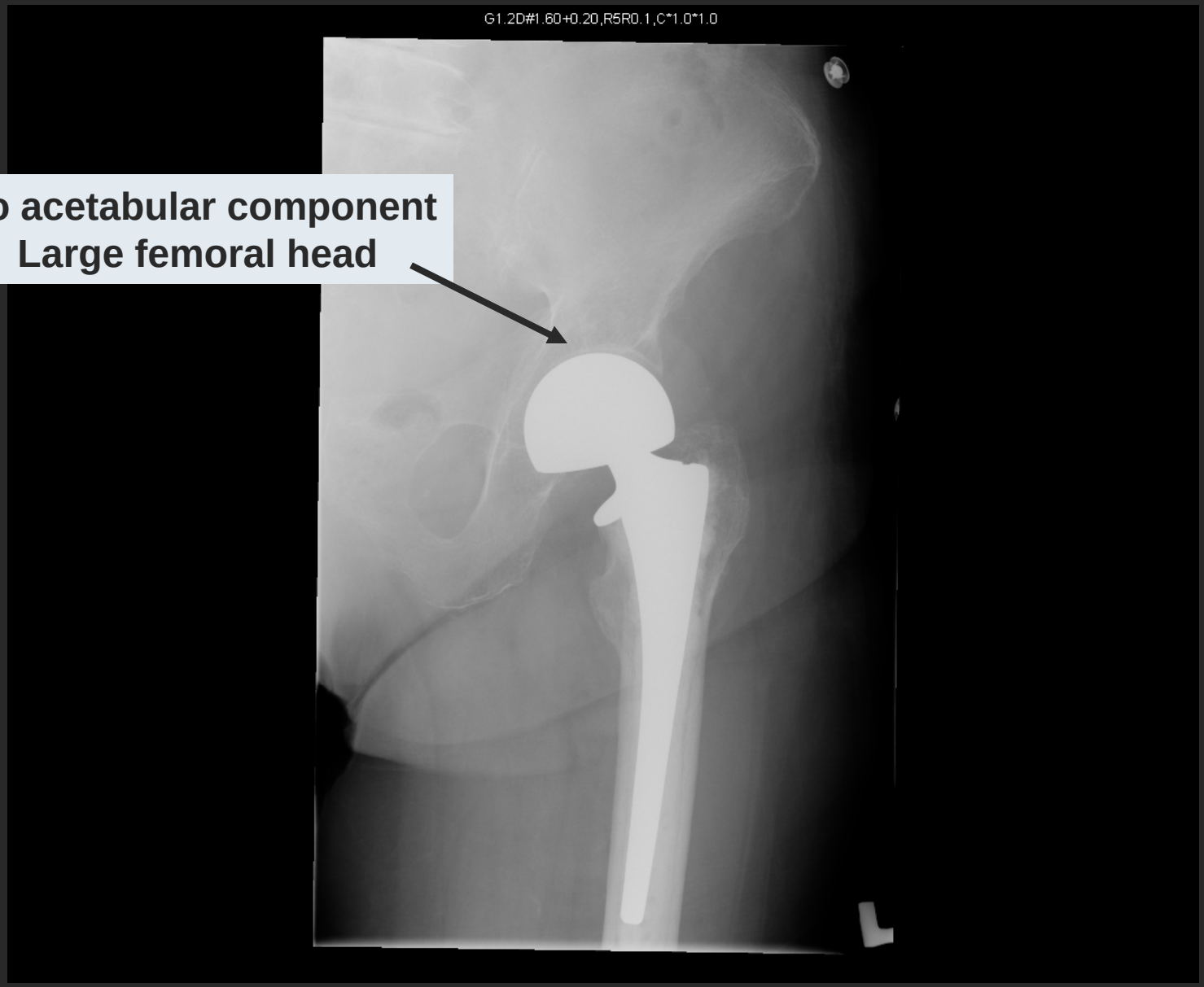
Target Population

- generally conducted on older individuals post hip # that cannot be repaired
- goal being to get the patient up and mobilizing

Advantages/Disadvantages

- decreased time in OR = less stress on patient
- risk of dislocation is low
- acetabular wear
- residual groin pain

Bipolar Hemiarthroplasty



3. Birmingham Hip Resurfacing

Description

- always metal on metal (no femoral stem)
- large femoral head (50-58 mm) cemented
- acetabular component not cemented

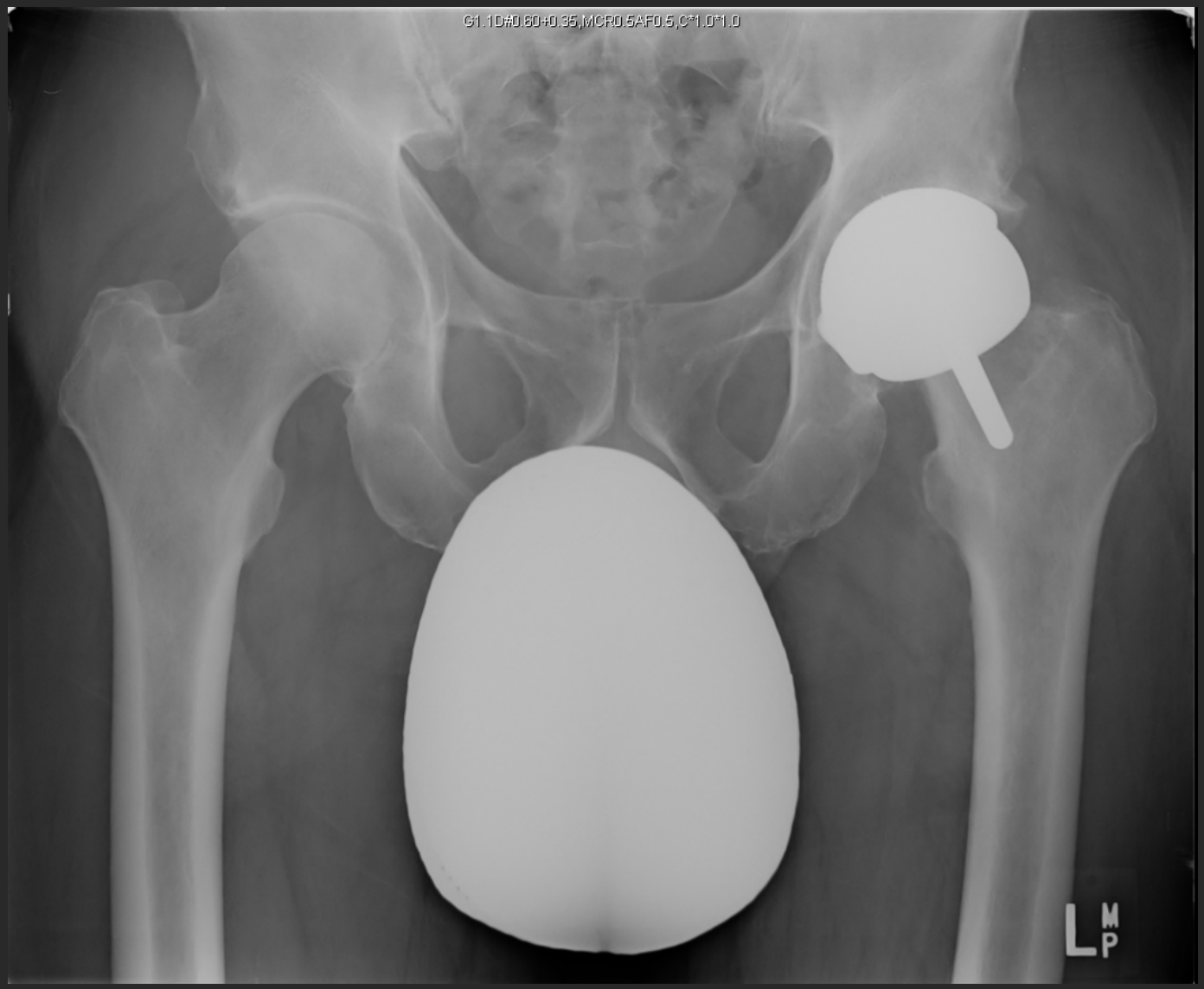
Target Population

- generally performed on younger males with good bone stock
- generally not females due to potentially increased risk of # in the femoral neck and risk of exposure to metal ions

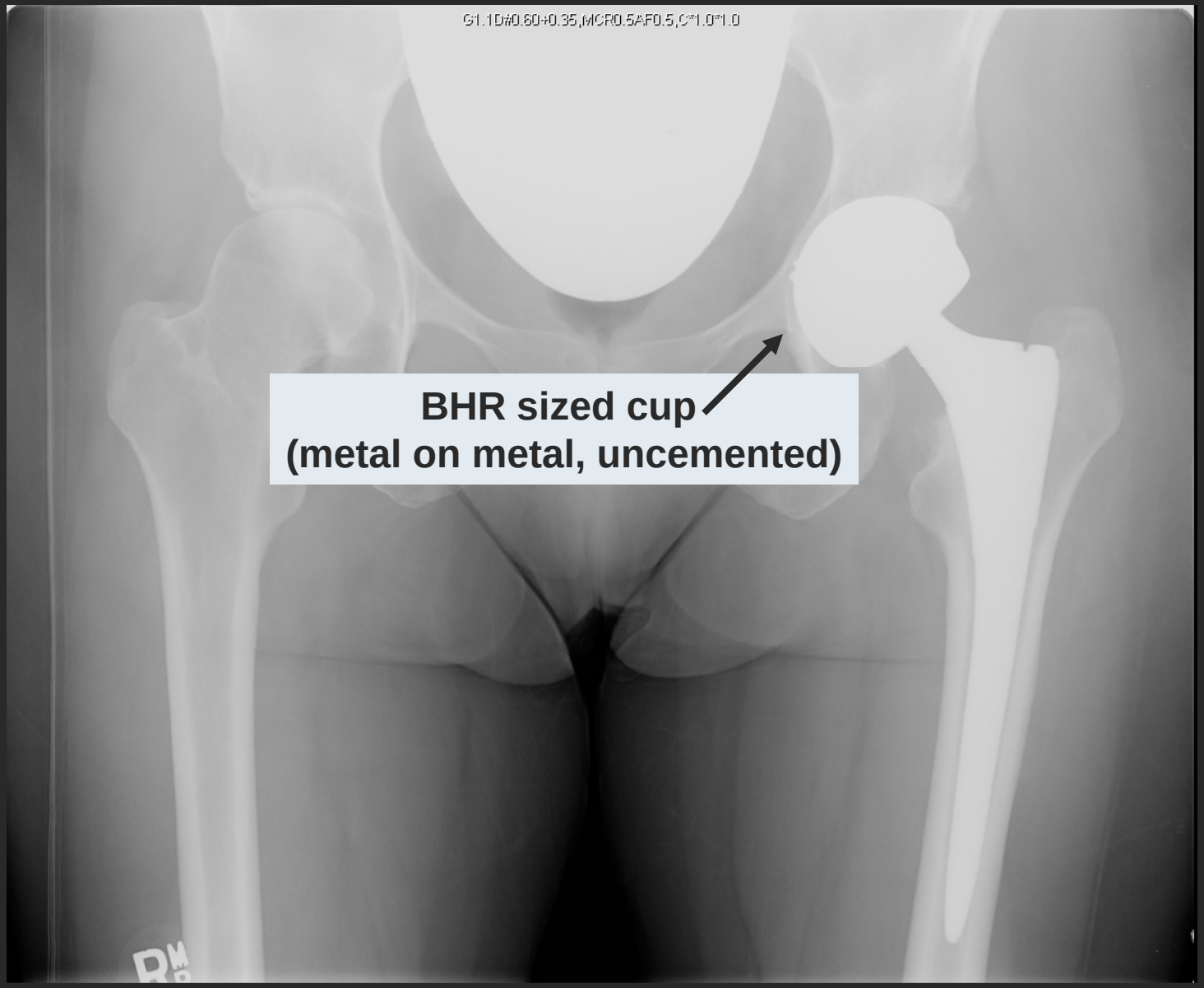
Advantages/Disadvantages

- risk of dislocation is low
- revision THA easier

Birmingham Hip Resurfacing



4.Modified Standard THA



Total Hip Arthroplasty

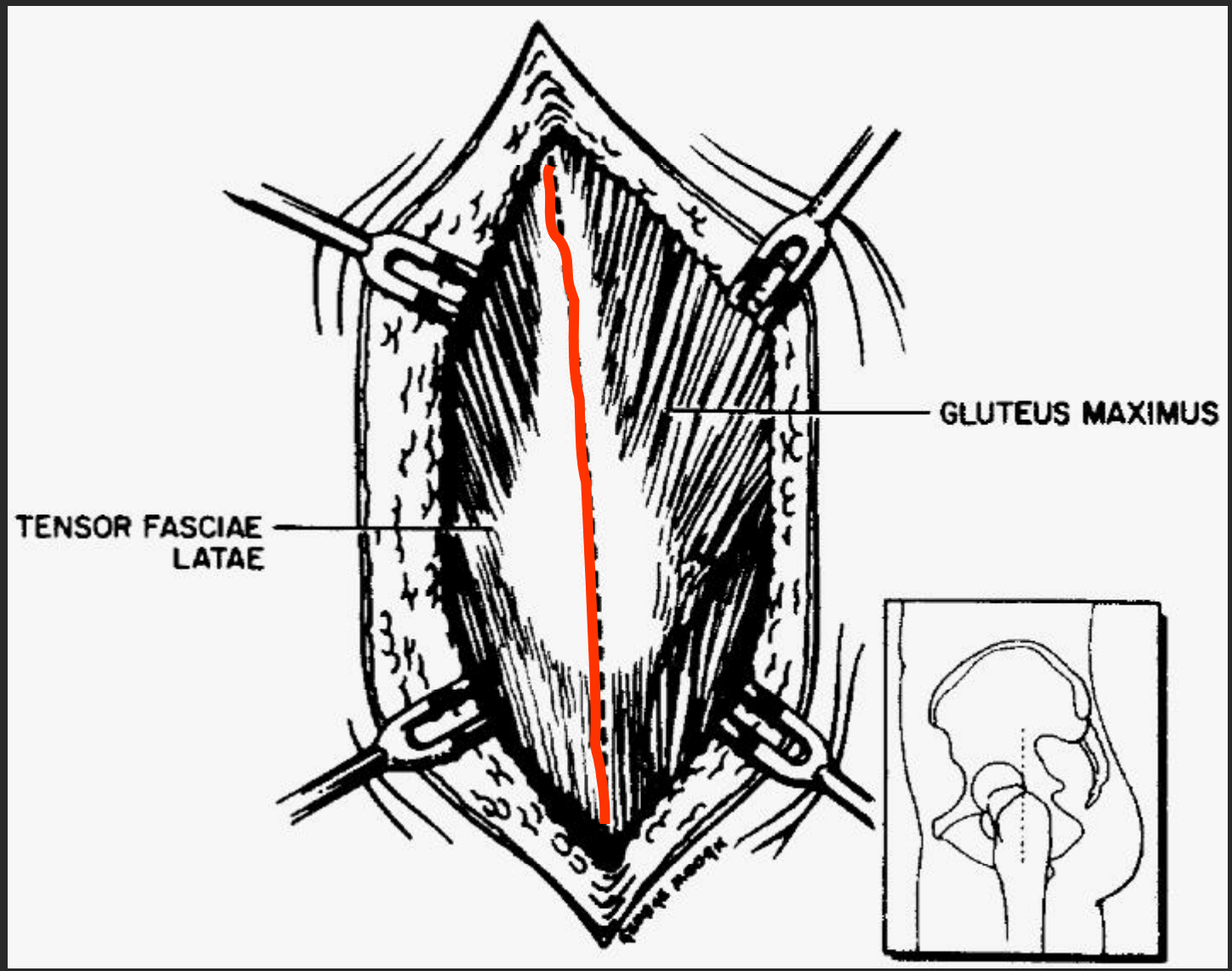
Surgical Approaches

Two approaches typically used at LHSC

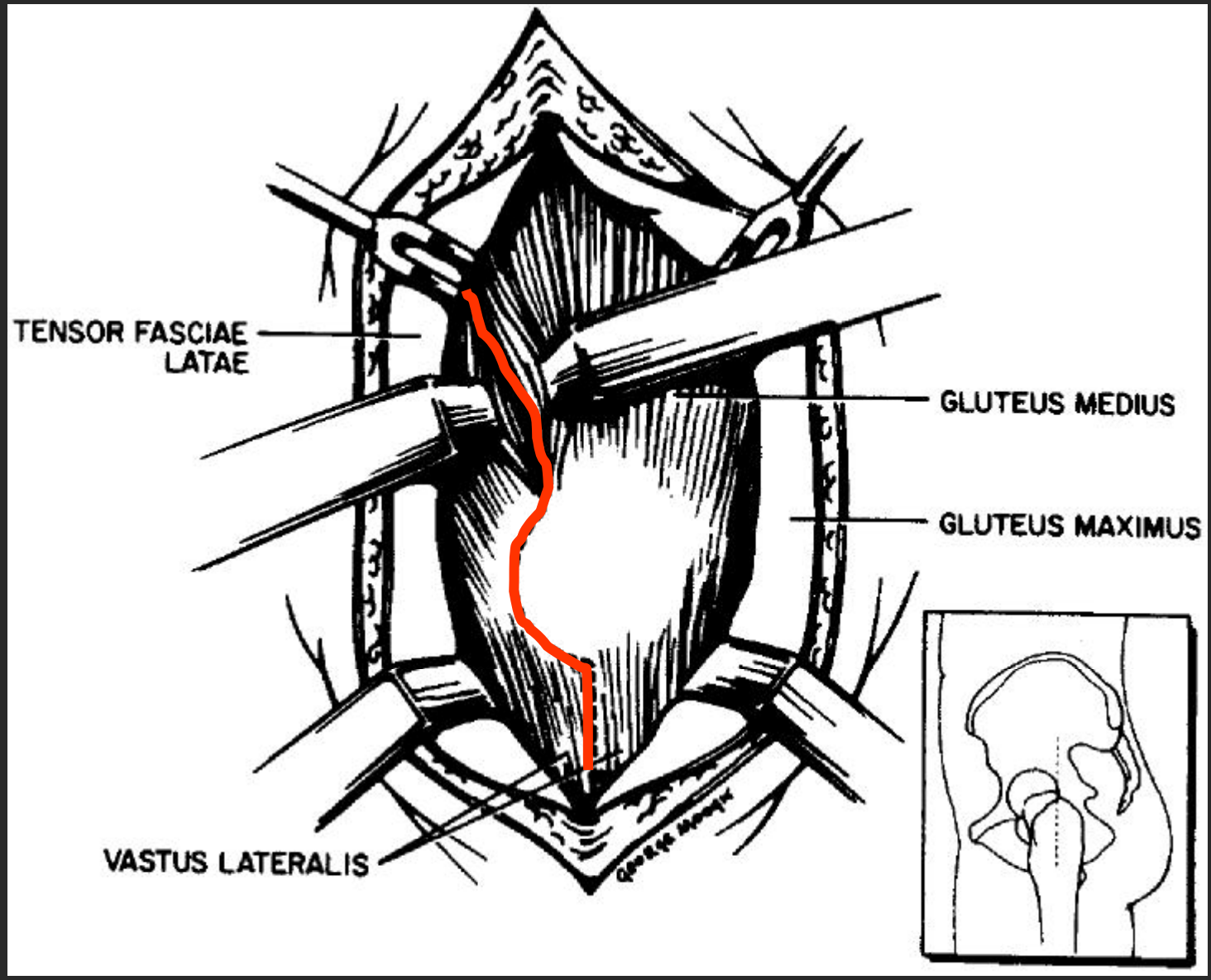
1. Modified lateral (Hardinge approach)
   - decreased dislocation rate

2. Posterior Approach
   - abductors are spared

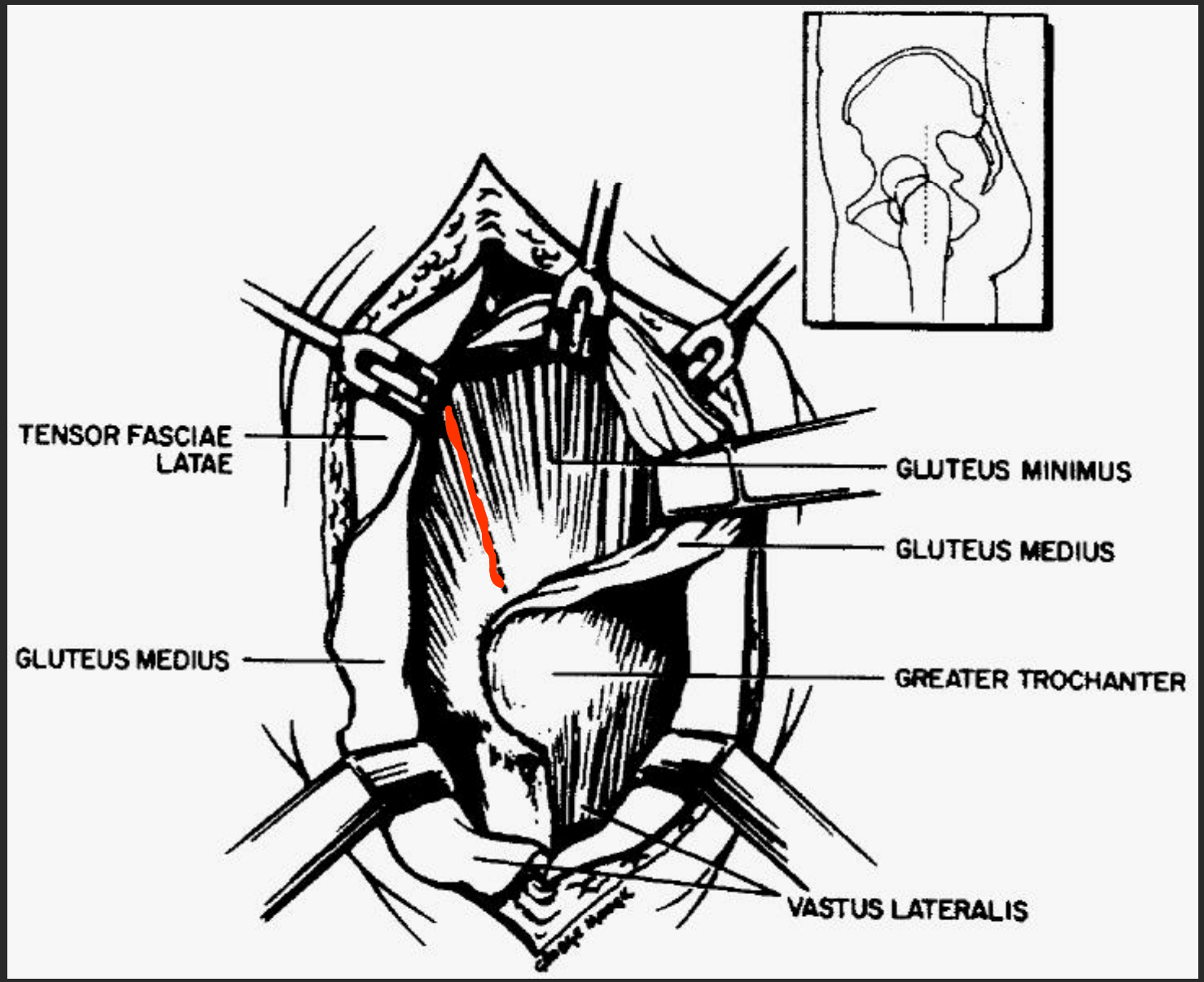
Modified lateral (Hardinge approach)



Modified lateral (Hardinge approach)



Modified lateral (Hardinge approach)



Modified lateral (Hardinge approach)

Rehabilitation Implications

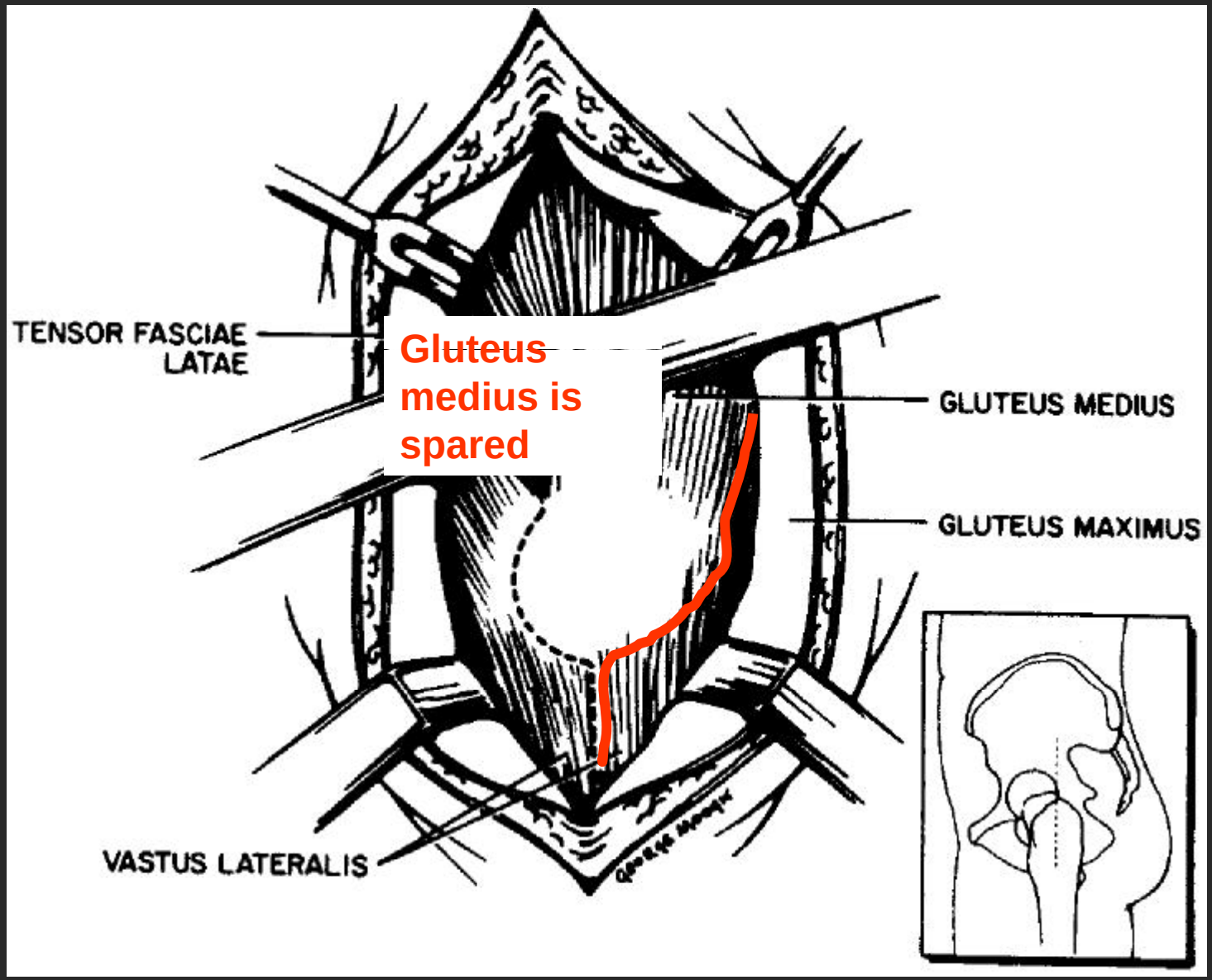
Advantages

- Risk of dislocation is low, 0.5% (posterior capsule is left intact)

Disadvantages

- Abductors are incised

Posterior Approach



Posterior Approach

Rehabilitation Implications

Advantages

- Abductors are spared
- Potential to return to higher level of function

Disadvantages

- Risk of dislocation is high compared to modified lateral approach, 3-4% (posterior capsule is incised)

Note: Dislocation rate reduced if small rotators repaired

Dislocation

- other than DVT, dislocation most common complication

- 60% of dislocations occur within first 5 weeks

- 85% of dislocations occur within 2 months

- 95 % can be reduced on first attempt

- recurrence rate can be up to 60 %

- 15 – 40 % may require revision

(Demos et al. Clinical orthopaedics and related research, No 393, 168-190, 2001)
(Bourne et al, Journal of ArthroplastyVol 19 No 4 2004,111-114)

Dislocations: common mechanisms

Mechanism	Percent
Getting up from a seated position	15%
Twisting while standing	14%
Fall	12%
Reaching for object on floor while standing/bending at waist	11%
Reaching for object on floor while in a seated position	10%
Putting on shoes/socks, foot care, shaving legs	6%
Hyperextension mechanisms	6%
Rolling over/ shifting positions in bed	6%
Twisting while sitting	5%

Data based on > 200 dislocations, 1998-2006, unpublished data, Mayo Clinic, Dr. J L Howard

Dislocations: common mechanisms and direction

Mechanism	Posterior	Anterior
Getting up from a seated position	26 %	6 %
Reaching for object on floor while in a seated position	16 %	0 %
Putting on shoes/socks, foot care, shaving legs	15 %	0 %
Reaching for object on floor while standing and bending at the waist	15 %	1 %
Fall	7 %	11 %
Hyperextension mechanisms	0 %	14 %
Twisting while standing	0 %	41 %

Data based on > 200 dislocations, 1998-2006, unpublished data, Mayo Clinic, Dr. J L Howard

Dislocations

Summary

- Mechanism of Dislocation

  - Flexion activities accounted for 42% of dislocations

  - Twisting activities accounted for 19% of dislocations

- Direction of Dislocation

  - Flexion activities accounted for 72% of posterior dislocations

  - Twisting and hyperextension accounted for 55% of anterior dislocations

Total Hip Arthroplasty

Rehabilitation

•Few studies address post-op management and activity restrictions

•There is little biomechanical data on which to base post-op protocols

•Youm et al (2005) – of 363 surgeons responding to a survey about post-op THA protocols 336 (90%) included dislocation precautions

- high toilet seat (96.6%)
- restricted hip flexion (79.9%)
- reacher/grabber (77.6%)
- abduction pillow (67.8%)
- high chair (56.6%)

• Based on the responses, suggest rehabilitation that will guide patients to a gradual resumption of full joint loading activities and protect patients from potential dislocations

Considerations for Post-Operative Protocol

- Protect patients from potential dislocations (movement restrictions)
- Hip abductor function/healing (exercise restriction)
- Cementless vs cemented (weight-bearing restrictions)
- Other factors: intraoperative, revisions (surgeon specific restrictions)

Total Hip Arthroplasty

Precautions

- No Flexion > 90 degrees
- No adduction beyond neutral
- No extremes of rotation
- No abduction exercises for the initial 4 weeks
- SLR with caution – not in first two weeks
  - good static quads – lock knee
  - good QoR

Precautions: consider flexion

Anatomy

- anteriorly ligaments most important in providing stability

- posteriorly muscles most important in providing stability

With Movement

-In flexion ligaments are relaxed and therefore femoral head is not as firmly held in the acetabulum

Flexion is a position of instability

Add adduction to flexion – little force needed to dislocate posteriorly

Total Hip Arthroplasty

General guidelines (0-6 weeks)

- adhere to precautions

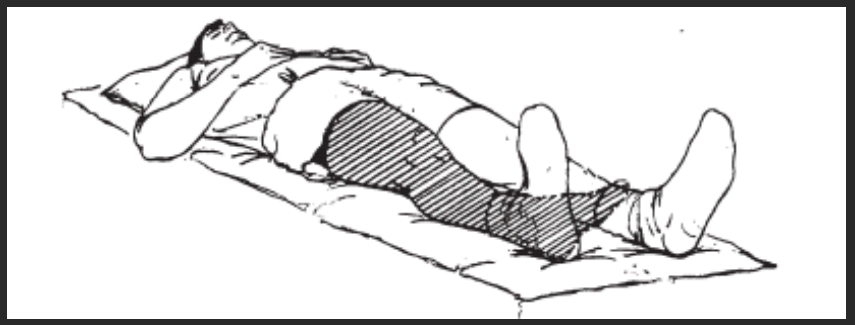
- Normalize gait pattern with appropriate aids based on WB'ing status (time frame for using aids based on the discretion of therapist)

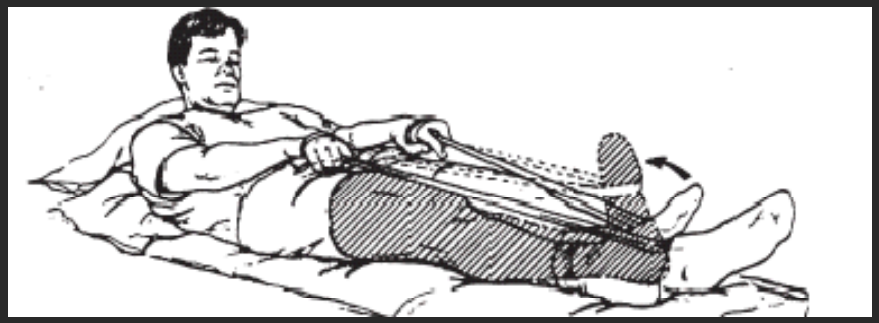
- Hip ROM within restrictions

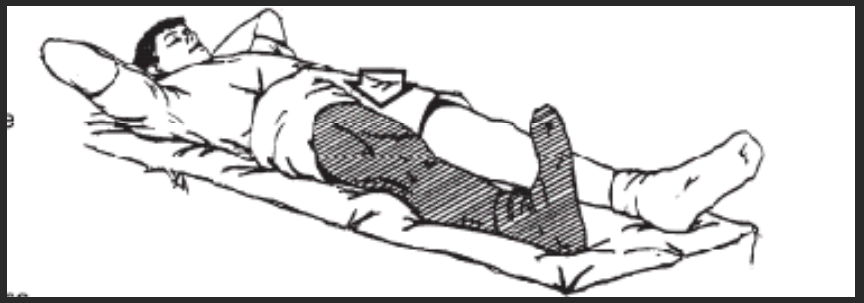
- Basic quadricep strength

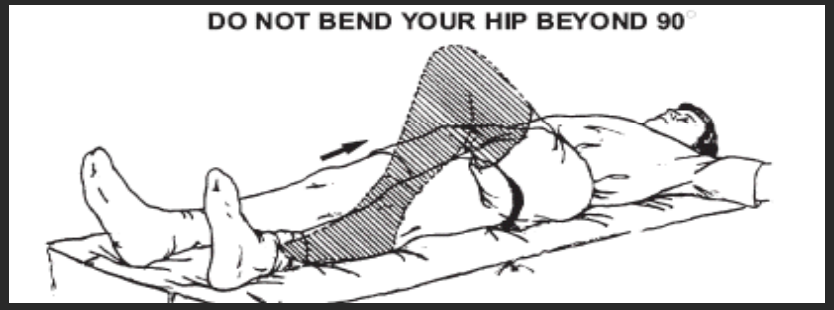
Total Hip Arthroplasty

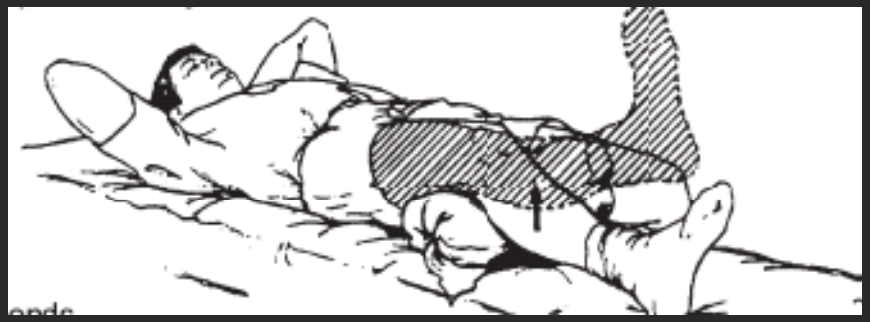
Exercises initiated in Hospital (initial two weeks)











Exercises initiated at two weeks

- Active Hip Flexion, Extension
- Active/Resisted Knee extension exercises (sitting)

Exercises initiated at four weeks

- Standing Hip Abduction

Total Hip Arthroplasty

General guidelines (> 6 weeks)

- precautions typically removed but hip ROM should not be forced
- Emphasis on functional activities in early stages
  (ADL's, stairs, ambulation with or without aids as necessary)
- Abduction strength
- Other Strengthening and proprioception exercises as tolerated
  to achieve patient specific goals

Exercises initiated at six weeks

- Side lying abduction exercises – progress as able
- Weight transfer exercises onto operated extremity (weaning off gait aids as appropriate)
- Progressive strengthening exercises as tolerated
  - -quads
  - -hamstrings
  - -gluts
  - -calf

RETURN TO SPORT

- agreement between surgeons to allow low impact sports
- previous participation in the sport should be considered
- time interval for return to sport
  - up to 3 months - 32 % of 760 surgeons
  - up to 6 months - 65 % of 760 surgeons
- participation in sport increases but the actual number of sports played decreases

Klein et al. Journal of Arthroplasty, 2007
Chatterji et al. 2004

Return to Sports

Allowed	Allowed with experience	Not recommended
Stationary Bicycling	Low-impact aerobics	High-impact aerobics
Croquet	Road bicycling	Baseball/softball
Ballroom dancing	Bowling	Basketball
Golf	Canoeing	Football
Horseshoes	Hiking	Jogging
Shooting	Horseback riding	Singles tennis
Shuffleboard	Cross-country skiing	Squash
Swimming	Downhill skiing	Hockey
Doubles Tennis	Ice skating/Rollerblading	Soccer
Walking	Weightlifting	Volleyball

Healy et al.2001, Klein et al 2007

Frequently Asked Questions

1. When can I lie on my surgical side?

   - as soon as you find it comfortable

2. If LLD is a concern when should it be corrected?

   - LHSC surgeons feel the wait time should be close to 12 weeks to let the muscles adapt to the new position and alignment and give prostheses some time to settle

Questions?