


Pre/Post-Op Considerations for RTS after Total Joints

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1



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2

Pre-Op Physical Therapy Considerations for RTS

- Total Shoulder Arthroplasty
- Reverse Total Shoulder Arthroplasty
- Total Knee Arthroplasty/Unicondylar Replacement
- Total Hip Arthroplasty
 - ✓ Modified Posterior Approach
 - ✓ Anterior Approach
 - ✓ Super Path Approach

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3



Why do surgeons perform total joint surgery?

- Relieve pain
- Improve Function
- Restore quality of life
- ✓ OrthoInfo.AAOS.org

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4




Total Shoulder Arthroplasty

- Joint Mobility
 - ✓ Arthrokinematics: roll, glide, spin
 - ✓ Osteokinematics: movement around joint axis
- Flexibility
 - ✓ Thoracic Cage
- Strength
 - ✓ Scapula, GH joint, torso
 - ✓ Pre-surgical RC condition: force coupling between deltoid and RC

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5



Reverse Total Shoulder Arthroplasty

- Joint Mobility
 - ✓ Arthrokinematics: roll, spin
 - ✓ Osteokinematics: movement around joint axis
- Flexibility
 - ✓ Thoracic Cage
- Strength
 - ✓ Scapula, GH joint, torso
 - ✓ Pre-surgical RC condition: force coupling between deltoid and RC

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6




Total Knee and Unicondylar Arthroplasty

- Joint Mobility
 - ✓ Hip Mobility: retroverted, anteverted
 - ✓ Arthrokinematics: roll, glide, spin
 - ✓ Osteokinematics: movement around joint axis
- Flexibility
 - ✓ Hip, Ankle
- Strength
 - ✓ Hip, Ankle

4/30/24 7

7



Total Hip Arthroplasty

- Joint Mobility: Pelvic stability, pre-morbid Lumbar spine issues
- Flexibility: importance of hip flexors vs extensors, postural considerations
- Strength: hip flexors vs hip extensors, hip abductors and length/tension
- So which approach is better?
 - All approaches: indifferent dislocation and intraoperative fracture rates.
 - early functional outcome and composite complications (dislocation, intra-operative fracture, wound complication, and nerve injury)
 - ✓ DAA was the best approach followed by DSA/SuperPath
 - ✓ DSA/SuperPath had better earlier functional outcome than PA, but still could not overcome the result of DAA.
 - ↳World J Orthop. 2024 Jan 18; 15(1):73-93

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8



SO...PT before surgery or no?

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9

Benefits of Pre-Op PT

- Improved mobility
- Increased strength
- Increased flexibility
- Non-narcotic pain management
- Nutritional Counseling
- Better Outcomes?

Garbage in...garbage out right?

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10

Biomechanics of Joint Mobilization

- Grade 1 mobilizations are small, slow oscillations at the beginning of a joint's range of motion.
- Grade 2 are large-amplitude, slow forces within the joint's entire available range.
- Grade 3 movements are large in amplitude, slow, and focused on the middle to end range of a joint's movement.
- Grade 4 mobilizations are slow, small amplitude movements at the end of a joint's range.
- Grade 5 mobilizations involve a single high-velocity, small-amplitude thrust at the end of the range.

4/30/24 11

11

RTS... Well what sports we talking about?

- Pickleball...fastest growing sport in America!
- Golf
- Tennis
- Softball
- Hiking
- Cycling
- Water Sports

4/30/24 12

12

Or we talking about practice?

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13

RTS...Kinetic Chain Assessment

- Joint above, joint below
- TSA/RTSA
- ✓ Scapular mobility/stability
- ✓ Quality of cuff repair
- ✓ Thoracic Mobility
- THA
- ✓ Pelvic assessment
- ✓ Lumbar assessment
- TKA/UJA
- ✓ Hip assessment
- ✓ Ankle assessment

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14

Post-Op rehab protocols... road map or google maps?

- Evidence based?
- ✓ Physiologic healing timeframes
- ✓ Tie-in to pre-operative PT
- "that's how the guys I learned from did it"
- Outpatient PT
- Home Health

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15

Basic Principles common to all post-op progressions...

- Protect the incision
- Prevent DVTs
- Restore joint mobility
- Restore flexibility
- ✓ length-tension relationships
- Restore strength
- Restore neural control of movement

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16

Basic Principles of exercise prescription...

- Proximal to distal
- Single plane to multi-plane
- Single joint to multi-joint
- Simple to complex movement patterns
- Non-specific to sport specific patterns

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17

Restoration of Neuromuscular control of movement

- Effects of long-term OA/DJD on proprioceptive system pre-surgically
- ✓ Functional consequences are slower speed and altered cadence, shorter stride
- Effects of implantation on joint proprioception
- ✓ Damages to mechanoreceptors yielding reduced proprioceptive capability
- ✓ Muscle mechanoreceptive organs like golgi tendon and muscle spindle can assist with changes and provide some feedback
- Gait dysfunction in WB joints

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18

Consider this...

- Aging is accompanied by a 30-40% decrease in muscle fiber numbers between 20-80yo
- Muscle fiber size is also reduced and more fiber specific yielding a 10-40% reduction in II size compared with younger controls
- Age mediated remodeling of motor units resulting in denervation of type II units for slower, more postural-biased type I fibers
- Essentially, loss of muscle strength and power with aging is caused by reductions in intrinsic force generating capacity
- ✓ Ann Rehabil Med, 2015 Apr, 39(2), 155-162.

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19

*TSA vs RTSA
Return to Sport
guidelines...*

- TSA
- ✓ Need for strong cuff function
- RTSA
- ✓ Need for stronger deltoid than cuff function
- Both require strong/mobile scapula and thoracic cage
- Kinetic chain considerations

4/30/24 20

20

*TSA vs RTSA
Return to Sport
guidelines...*


- Evidence?
- ✓ 60% return rate to prior level of sports activity
- ✓ Noncontact, low demand activities generally offer higher return rates
- ✓ TSA 75-100%
- ✓ HA 67-76%
- ✓ 5-6 month date of return
- World J Orthop. 2016 Sept 18; 7(9): 519-526, Level 1.
- ✓ RTSA 67% RTS at 6 mos, decreases over time, 48% at 4 years
- Orthop J Sports Med, 2022 Nov: 10(11), Level 4.

4/30/24 21

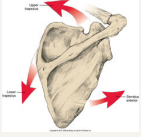
21

Key force couples for RTS in anatomic shoulder...

Deltoid and Rotator Cuff



Upper Trap and Serratus



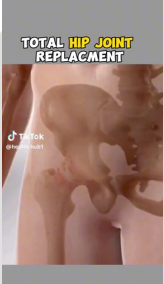
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22

22

“You take care of it, it will take care of you...”



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23

23

RTS in THA

- Generically:
 - ✓ HSS: 3-6 months after surgery
 - ✓ AAHKS: within first 3 months
 - ✓ Systematic review, level 4 January 2023: low to moderate impact between 7-12 months
- More specifically:
 - ✓ Low impact, recommended
 - ✓ Intermediate impact, recommended with experience
 - ✓ High impact, not recommended though may be cleared by surgeon

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24

24


*“You take care of it,
it will take care of
you...”*



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25

*Personal experience...
DAA THA secondary to
AVN done 02/21/2023,
range by 3/18/2023,
shoot 83 3/24/2023.*



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26

*Concerns
versus
Considerations*

Concerns:

- Higher levels of activity post-THA MAY increase risk for fracture, dislocation, and poor long-term outcomes
- Evidence conflicting, not reflective of advanced polyethylene and prosthetic choices or approaches

Considerations:

- Still a relative paucity of data that suggests poor outcomes with higher levels of sporting activity
- Some evidence suggests wear MAY be related to activity levels, but no definitive impact on long term clinical outcomes

✓Int J Sports Phys Ther, 2014 Nov, 9(6), 839-850. 4/30/24 27

27

*DAA vs PA:
59% overall
RTS, does
popularity =
functionality?*

DAA:

- More likely to attempt pre-op return to sporting activity levels
- Participated in greater amount of recreational activity
- ✓ Arch Orthop Trauma Surg 2021, 141(3) 497-507

PA:

- No definitive high-level evidence for long-term superiority of DAA over PA in terms of soft tissue healing or long-term clinical outcomes
- Enhanced capsular closure and larger heads = far fewer episodes of dislocation
- ✓ J AM Acad Orthop Surg Glob Res Rev, 2022 Jan, 6(1).

4/30/24 28

28

*Post-op c/o
LLD...functional
or mechanical?
RTS
implications?*

Mechanical:

- Appears lengthening more common than shortening
- WB pelvis to floor AP view most accurate after 6 weeks, no correlation between LLD and HHS
- ✓ Sci Rep, 11, 23262 (2021).


Functional:

- Associated with new onset LB/SI pain >10mm
- Anything <1/2" is statistically not even sensed by the body, but is reported 30% of the time
- Considerations...how did patient move pre-operatively? Length of time and levels of pain pre-op? Pre-existing comorbid ortho issues?

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29

*Since we're all
here...*



Do:

- Encourage patients to walk, encourage arm swing to balance out likely poor pelvic determinants of gait post-operatively once transitioned from FWW/SPC
- Encourage patients that pain is your brain's interpretation of how it should respond to a given stimulus, not an excuse to stop

Don't:

- Give them anything with a SLR in any plane as the joint rxn forces alone will likely lead to pain due to hip flexor tendinitis or pelvic torsional issues
- Send them to Home Health unless there are transportation issues or some other type of comorbidity that would preclude them from attending OP PT.

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30

RTS in TKA

- Generically:
 - ✓ TKA survival rate 95% higher than it was 10-15 years previous
 - ✓ Minimum post-op recovery RTS is 3 months
 - ✓ On avg RTS in 6 month
- More specifically:
 - ✓ Authorized, recommended
 - ✓ Authorized, with experience
 - ✓ High impact, not recommended though may be cleared by surgeon
 - ✓ Higher rates of revision males < 65yo for both TKA/UKA

4/30/24 31

31

*“You take care of it,
it will take care of
you...”*



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32

RTS in TKA

- Straight from AAHKS website:
 - ✓ Know your body and have realistic expectations
 - 1) If this were the case, probably wouldn't need TKA at all
 - ✓ Use common sense
 - 1) See #1 above. Short supply these days...
 - ✓ Stay active after knee replacement
 - 1) 95% of the US can't walk a mile without stopping
 - ✓ Talk to your doctor
 - 1) White coat syndrome

4/30/24 33

33

RTS in TKA

- Bone Jt Open 2022; 3(3): 245-251
- ✓ Meta analysis: 410 articles including 58 duplicates
- ✓ 34-100% of TKA patient RTS 12-13 weeks
- ✓ Prior experience with sport most significant prognosticator for return
- ✓ Most likely to return to low-moderate impact sports
- ✓ Low-quality, insufficient data for return to high impact sports yielding reduced survivorship
- ✓ UKA return one week sooner than TKA on avg

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34

Revision vs Primary...

- What changes in RTS?
- ✓ Additional soft tissue work? Surgical approach...
- ✓ Additional bony stabilization?
- ✓ Infection?
- ✓ Other comorbid medical issues?
- ✓ What sport are they trying to return to?
- Communication with surgical staff is key...

35

Conclusions...

- We don't know as much as we think we do, ongoing research always necessary
- It is imperative to advocate for your patients.
- Dialogue and a complete focus on "total" picture is necessary
- ✓ Nutrition...can't pour from an empty cup...most often overlooked piece
- ✓ Importance of ongoing physical activity...recovery is a journey, not a destination, don't short circuit PT
- ✓ Help set realistic expectations from the start..."Embrace the Suck"

36