

Defining Success after Joint Preserving Surgery of the Hip: A Prospective Database of over 1000 cases

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INTRODUCTION

- Joint preserving surgery of the hip (JPSH) has evolved tremendously
- Dramatic increase in number of JPSH
- Includes arthroscopy, surgical dislocation (SD) and peri-acetabular osteotomy (PAO)
- Still work to be done with regards to appropriateness and effectiveness

PURPOSE

To define overall reoperation and complication rates of JPSH performed by a single surgeon

To categorize all hip joint reoperations into modes of failure

METHODS

Participants

- 1013 JPHS between 2005 and 2015
 - > 783 Hip arthroscopies
 - > 122 Hip surgical dislocations (SD)
 - > 108 Peri-acetabular osteotomies (PAO)

Indications

- Femoro-acetabular impingement (FAI)
- Isolated intra-articular cartilage abnormalities
- Developmental dysplasia of the hip (DDH)
- Slipped capital femoral epiphysis (SCFE)
- Perthes

Exclusion

- Removal of implants

Mode 1 Failures – Organ Failure

- 64 (6.3% of total JPSH) subsequently had hip arthroplasty

Index Procedure

- 55 arthroscopy (7%)
- 8 SD (7%)
- 1 PAO (1%)
- Tonnis 1 at index procedure
- Tonnis 2 as time of replacement
- Mean age at hip arthroplasty: 46.8 years
- Mean time after index procedure: 3.2 years

Mode 2 Failures - Misdiagnosis

- 17 (1.7% of total JPSH)
 - > 10 FAI
 - > 5 Dysplasia
 - > 2 Acetabular retroversion

Index Procedure

- 16 arthroscopy (2%)
- 1 SD (1%)
- Mean age at reoperation: 28.9 years
- Mean time after index procedure: 2.2 years

Mode 3 Failures – Mal/Inadequate Correction

- 23 (2.3% of total JPSH)
 - > 20 persisting or new labral damage
 - > 3 FAI

Index Procedure

- 16 arthroscopy (2%)
- 2 SD (2%)
- 5 PAO (5%)
- Mean age at reoperation: 30.2 years
- Mean time after index procedure: 2.0 years

LIMITATIONS

- Retrospective study
- One surgeon
- Using joint replacement as the end point for Mode 1 failures- less sensitive
- Tonnis score is insensitive to early degenerative changes compared to advanced cartilage imaging such as T1Rho and dGEMRIC 31.

RESULTS

Table 1. Demographics of the study population at the time of initial JPSH: all JPSH and patients falling into Modes 1, 2, or 3.

	Mode 1 (n = 64)	Mode 2 (n = 17)	Mode 3 (n = 23)	All Modes (n = 104)	All JPSH (n = 1013)
Gender Distribution	32 males (50%) 32 females (50%)	5 males (30%) 12 females (70%)	8 males (45%) (65%) 15 females (65%)	45 males (43%) (57%) 59 females (57%)	509 males 504 females
Mean Age at HPP (years)	46.8 (18-64)	28.9 (17-42)	30.2 (19-51)	35.5 (17-64)	39.0
Mean BMI at HPP	37.0	27.2	24.8	31.9	26.1
Initial and Final JPHS	PAO + THA (1) Scope + THA (39) Scope + RSA (16) SD + THA (6) SD + RSA (2)	Scope + PAO (7) Scope + SD (2) Scope + (7) SD + Scope (1)	PAO + Scope (5) Scope + PAO (1) Scope + Scope (15) SD + Scope (2)	n/a	n/a

Table 2. Summary of initial diagnosis and causes of re-operation across Mode failures.

	Mode 1 (n = 64)	Mode 2 (n = 17)	Mode 3 (n = 23)	All Modes (n = 104)
Initial Diagnosis				
FAI	36	4	14	54
Labral damage	48	10	16	74
Chondral damage	27	6	8	41
Dysplasia	4	0	3	7
Fracture	1	0	1	2
Chondrocalcinosis	1	0	0	1
Limbus anteriorly	0	0	1	1
Diagnosis at time of second surgery				
Degenerative OA in all cases		Incorrect Diagnosis	Incorrect/Inadequate Correction	
		New pincer finding (7)	Persisting/new labral tear (20)	
		New CAM finding (5)	Persisting FAI (3)	
		New dysplasia finding (5)		

Table 3. Summary of Tonnis arthritis scores and Beck damage found perioperatively during JPSH, at re-operation, and at last follow-up where applicable.

	Mode 1 (n = 64)	Mode 2 (n = 17)	Mode 3 (n = 23)
Tonnis Score at JPSH	Average = 1 (1-3)	Average = 0 (0-1)	Average = 0 (0-2)
Mean Beck damage found at JPSH	Acetabular cartilage 3 Labrum 1 Head cartilage 1	Acetabular cartilage 2 Labrum 2 Head cartilage 0	Acetabular cartilage 1 Labrum 2 Head cartilage 0
Tonnis score at re-op	Average = 2 (0-3)	Average = 0 (0-1)	Average = 0 (0-2)
Mean Beck damage during re-op	Not assessed	Acetabular cartilage 1 Labrum 2 Head cartilage 0	Acetabular cartilage 1 Labrum 2 Head cartilage 0
Tonnis score at last follow-up	n/a	Average = 0 (0-1) Average change = 0	Average = 1 (0-2) Average change = 0

Table 4. Summary of complications following JPSH accomplished by arthroscopy (scope), surgical dislocation (SD), or periacetabular osteotomy (PAO), with associated complication grades (Sink Grade 1-5).

Complications of JPSH	Scope (n = 783)	SD (n = 122)	PAO (n = 108)	Total (n = 1013)
Sink Grade 1				
Wound Infection	2 (0.3%)	1 (0.8%)	1 (1.5%)	4 (0.4%)
Lateral femoral cutaneous nerve paraesthesia	0	0	11 (17%)	11 (1.1%)
Pudental nerve palsy	10 (1.3%)	0	0	10 (1%)
Heterotopic ossification	0	0	2 (3.1%)	2 (0.2%)
Total				27 (2.8%)
Sink Grade 2				
Peroneal nerve palsy (foot drop 24 hours)	1 (0.1%)	0	0	1 (0.1%)
Lateral femoral cutaneous nerve paraesthesia with pain	0	0	4 (6.2%)	4 (0.4%)
Sciatic Nerve Palsy	0	1 (0.8%)	0	1 (0.1%)
Femoral Nerve Palsy	0	0	1 (1.5%)	1 (0.1%)
Total				7 (0.7%)
Sink Grade 3				
Trochanteric non-union	0	3 (2%)	0	3 (0.3%)
Intra-articular adhesions	2 (0.3%)	1 (0.8%)	0	3 (0.3%)
Heterotopic ossification	1 (0.1%)	0	0	1 (0.1%)
Total				6 (0.6%)
All Grades				
Total	15 (1.9%)	6 (4.9%)	21 (19.4%)	40 (4%)



CONCLUSIONS

JPSH is Beneficial

The concept of mode of failures can lead to useful changes in practice to further improve the quality of care

Correct diagnosis followed by correct procedure is important in preventing failure