

# Development of Post-operative Shoulder Rehabilitation Guidelines

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On behalf of the Shoulder and Upper Extremity Research Group of Edmonton (SURGE)

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## Chapter I. INTRODUCTION

Surgical repairs are commonly performed on patients who present with rotator cuff and/or labral lesions. Over the years, surgical procedures have shifted from open to less invasive arthroscopic approaches, resulting in reduced patient morbidity and post-operative complications.<sup>1-6</sup> Rehabilitation following surgical procedures must balance the restoration of motion and function while maintaining the desired result of the surgical repair. Several post-operative protocols have been developed to meet this goal; however they vary in content and timelines and are usually derived from surgeon preference, clinical experience and procedure performed.<sup>7-22</sup> Furthermore, physical therapists (PTs) do not always receive, use and/or follow post-operative protocols, having a tendency to “fit the protocol to the patient” rather than the patient to the protocol. Thus, the lack of standardized physical therapy (PT) treatment following shoulder surgery makes it difficult to measure the effectiveness of varying rehabilitation programs. Heterogeneous post-operative management also hinders the comparison of patient outcomes among different surgical procedures and studies. There is a clear need to develop standardized, evidence-informed and consensus-derived postoperative

shoulder rehabilitation guidelines that can be used to treat patients who have undergone common shoulder surgical procedures.

The Shoulder and Upper Extremity Research Group of Edmonton (SURGE), a group of upper extremity orthopedic surgeons, upper extremity PTs, sports medicine physicians and researchers, undertook this challenge developing post-operative shoulder rehabilitation guidelines for patients following Arthroscopic Bankart and Arthroscopic/ Mini-Open Rotator Cuff Repairs. The main objective in developing the guidelines was to provide a common platform from which surgeons, PTs and physicians could communicate. The ultimate goals were that the guidelines would lead to improved, standardized care for post-operative shoulder patients while providing information that is *appropriate* (to the specific surgical procedure and specificity of the patient), *beneficial* and *worthwhile* (provide the user with accessible, useful, easy to interpret information).

## Chapter II. DEVELOPMENT OF GUIDELINE CONTENT

The shoulder rehabilitation guidelines were developed using a stepwise process to apply the best-available evidence and gather input from multiple stake-holders to ensure that the final product was evidence-based, but also had clinical applicability.

Step One: Literature Review - Selected databases were searched, including MEDLINE, PEDro, EMBASE, Cochrane Library and CINAHL for relevant, English-language studies, published between 1999 and December 2009, related to post-operative management following arthroscopic Bankart and Rotator Cuff repairs. Keywords and their synonyms were used to sensitize the search and references of the articles found were checked for other potentially helpful studies. A detailed list of search terms and databases used for this review may be found in Appendix 1.

Our search yielded a limited number of articles related specifically to post-operative Bankart and Rotator Cuff rehabilitation.<sup>7, 8, 10-12, 21, 22</sup> Few studies were Level I or II clinical trials. Most research investigated a question related to different surgical techniques and included only a brief description of the post-operative management. Two studies, during this time period, compared outcomes between early motion and conventional immobilization rehabilitation protocols.<sup>10, 13</sup> Raab et al<sup>21</sup> and Lastayo et al<sup>22</sup> both conducted studies to determine the effectiveness of continuous passive motion (CPM) on rotator cuff repair rehabilitation and finally two additional research groups<sup>12, 14</sup> evaluated the effect that treatment delivery method (i.e. supervised, unsupervised, video instruction) had on patient outcomes following rotator cuff repair.

Articles collected were therefore used to explore various protocols and determine key themes among protocols. Most were presented in a phase-by-phase format with general goals progressing from immobilization to mobilization to strengthening and finally, return to activity. Discrepancies related to the position and duration of immobilization, restrictions, timeline for progressing between phases as well as progressing key interventions such as passive range of motion (PROM) to active-assisted range of motion (AAROM) to active range of motion (AROM) and resisted exercises were noted and are presented in Tables 1a and 1b.

Step Two: Collection of Regional Shoulder Protocols - A total of 13 post-operative shoulder protocols were collected from seven local upper extremity orthopedic surgeons. These included protocols prescribed for patients following Arthroscopic Bankart and

Arthroscopic/Mini-Open Rotator Cuff surgical repairs. The protocols were combined into one document to highlight commonalities and differences (Tables 2a. and 2b.) to facilitate discussion amongst the seven surgeons and four upper-extremity specialist PTs.

Step Three: Development of Consensus/Evidence Document - We then combined published evidence with the information provided from the review of surgeons' protocols. Areas of discrepancies were identified, including immobilization time frames, precautions and contraindications, key treatment interventions and criteria for progression of rehabilitation. Available evidence, basic science, physiology and clinical expertise were used to help guide and support the decisions made. A consensus meeting was held with both PTs and surgeons to create a single regional protocol for postoperative rehabilitation for each surgical procedure that could be modified by the surgeon as indicated by tissue/repair quality. This process resulted in draft regional rehabilitation guidelines for each surgical procedure.

### **Chapter III. DEVELOPMENT OF GUIDELINE FORMAT - NEEDS ASSESSMENT**

To determine how best to present the regional guidelines to clinicians, we undertook both focus groups and an online survey of Alberta PTs.

Focus Groups: Forty-seven PTs, working primarily in private practice, participated in focus group discussions seeking their opinions and usage of current post-operative shoulder protocols as well as their preferences on presentation/format of the newly developed shoulder guidelines. Overall, therapists stated they used current shoulder protocols more as a reference for general timelines and ideas about appropriate interventions. Several participants expressed frustration that protocols were not uniformly given to patients and that they were variable among surgeons. Participants also indicated that protocols did not consider patient variability. Important components suggested to be included in the regional guidelines were more details regarding the surgical procedure, patient-specific cautions/contraindications, guidelines for progression and suggested

**TABLE 1a: POST-OPERATIVE BANKART REPAIR**

Protocol component	Summary	Reference
Immobilization	Traditional Sling x 2 wks.	McDermott et al, 1999
	Traditional Slink x 2-4 wks.	Hiemstra et al, 2008
	Traditional Sling x 3 wks. (for comfort)	Blackburn et al, 2000
	Traditional Sling x 4 wks.	Cole et al, 2000 Boileau et al, 2006
	Sling with 20° flexion/30° abduction x 6 wks.	Fabbriciani et al, 2004
Restrictions	ER limited to 45° until Day 45	Boileau et al, 2006
	No ER + horizontal abduction x 3 wks.	Blackburn et al, 2000
	No ER initially	Fabbriciani et al, 2004
Mobility	AAROM at 4 weeks	Cole et al, 2000
	Pendulum ex. - Day 1	Boileau et al, 2006
	Pendulum ex. + AAROM flexion at 3 wks. ( <i>group 1</i> ) Pendulum ex., PROM + AAROM (flexion + IR) to tolerance - Day 3 / full AROM allowed (minus abduction+ER) at wk 4 ( <i>group 2</i> )	Kim et al, 2003
	PROM - scaption, ER (in scapular plane) - Day 2 / Progress to AROM all motions by 3 wks. / Grade III-IV joint mobilizations after minimum of 6 wks. / stretching allowed at 6 wks.	Blackburn et al, 2000
	Independent mobilization at 4 wks.	McDermott et al, 1999
	PROM + AAROM elevation + ER (neutral) at 2 wks. / AROM all motions at 6 wks.	Hiemstra et al, 2008
	PROM + AAROM at 3 wks / capsular stretching at 12 wks	Fabbriciani et al, 2004
	Strength	Begun "when patient recovers sufficient motion to perform ADL"
Begun between 8-12 wks.		Boileau et al, 2006
IR ex at 4 wks./ER ex at 6 wks./diagonal ex at 9 wks. ( <i>group 1</i> ) Submax isometric ex on Day 3 / isotonic IR at 2 wks. / isotonic flexion + ER at 4 wks. / diagonal ex + IR, ER, deltoid dumbbell ex at 6-9 wks. / tubing ex. at 90/90 position at 10-12 wks. ( <i>group 2</i> )		Kim et al, 2003
Scapular ex + GHJ isometrics begun wk. 1 / progressed through available ROM + with increased weight as tolerated		Blackburn et al, 2000
Isometric ex + swimming at 6 wks.		McDermott et al, 1999
Strength ex. as tolerated at 6 wks.		Hiemstra et al, 2008
Isometric + isotonic ex between 3-6 wks. / advanced strengthening at 12 wks.		Fabbriciani et al, 2004
Return to Activity		Throw ball or swim at 4 mos. / contact + collision sports at 8 mos.
	Begin return to football, wrestling, overhand activities at 4-6 mos.	Boileau et al, 2006 Blackburn et al, 2000
	Non-contact, non-throwing sports at 10-12 wks. / throwing + contact sports at 16 wks.	McDermott et al, 1999
	Sport-specific training x 5-6 mos. / overhead activities x 9 mos. / full overhead activity x 12 mos.	Rubenstein et al, 1992
	Return to sport at minimum 4 mos.	Hiemstra et al, 2008
	Return to sport at 6 mos.	Fabbriciani et al, 2004

**TABLE 1b: POST-OPERATIVE ROTATOR CUFF REPAIR**

Protocol component	Summary	Reference
Immobilization	Velpeau Sling x 6 wks.	Baysal et al, 2005 Watson et al, 2002
	Traditional sling x 4 wks. ( <i>group 1</i> ) Traditional sling x 6 wks. ( <i>group 2</i> )	Klintberg et al, 2009
	Traditional Sling - pts encouraged to discard sling after Day 1	Hayes et al, 2004
	Traditional Sling x 4 wks.	Hersch et al, 2000 Severud et al, 2003
	Traditional Sling (abduction pillow) x 3 wks.	Ide et al, 2005 Ghodadra et al, 2009
	Traditional Sling x 5 wks.	Kang et al, 2007
	Abduction Sling x 6 wks.	Millett et al, 2006
	Traditional Sling (small/medium tears) 4-6 wks Abduction Brace (large/massive tears) 4-6 wks	Sauerbrey et al, 2005
Mobility	AAROM (except abduction) + pendular ex from 2-6 wks. / AROM + self-assisted stretching from 6-10 wks. / joint mobilizations + stretching from 10-26 wks.	Baysal et al, 2005
	PROM, Pendular ex, scaption to 45° - Day 1 / AAROM at 4 wks., AROM at 6 wks.	Klintberg et al, 2009
	Pendular ex, PROM - Day 1 / AAROM, IR + ER at 6 wks. / AROM at 10 wks. ( <i>group 2</i> )	
	Scapular retraction, pendular ex - wk 1 / AAROM flexion+ER - wk 2 / AAROM to AROM - wk 6	Hayes et al, 2004
	PROM elevation+ER begun Day 1 - progressed for first 4-6 wks. / AROM at 6 wks.	Hersch et al, 2000
	PROM+CPM machine - Day 1 / AAROM at 2-4 wks.	Ide et al, 2005
	PROM + pendular ex 1-5 wks. / passive, self-assisted stretching allowed at 5 wks.	Kang et al, 2007
	Pendulum ex - Day 1-6 / PROM flexion, ER, IR - Day 7-28 / AAROM to AROM to PROM + stretching 6-12 wks	Millett et al, 2006
	Pendulum ex, progressive PROM + AAROM 0-2 wks. / increased 2-4 wks / full PROM by wk 4 / AROM+stretching at 5-6 wks.	Ghodadra et al, 2009
Pendulum + PROM flexion+ER from 1-6 wks. / AROM begun at 6 wks.	Sauerbrey et al, 2005	

exercises for each rehabilitation phase. (Table 3) Information from the focus groups was used to construct the survey.

**Survey of Alberta PTs:** We then developed an on-line, anonymous survey, sent out to approximately 2000 Alberta-licensed PTs, to determine current practice patterns relative to managing patients following Arthroscopic Bankart and Arthroscopic/Mini-Open Rotator Cuff repairs, specifically whether they received post-operative protocols from the referring surgeons, if they followed the protocols and why or why not. Additional questions

regarding the shoulder protocol components were also included. Finally, demographics (i.e. age category, gender) and practice information (i.e. degree, year graduated, practice setting and practice specialization) were collected. (Appendix 2) All PTs were sent the survey to ensure completeness; however the exact number of therapists that actively treat patients following shoulder surgeries was unknown. PTs were given three weeks to reply to the survey with weekly reminders to increase response rate.

**Survey Results:** One hundred and nineteen

TABLE 1b CONTINUED

Protocol component	Summary	Reference
	PROM flexion + ER begun immediately / AAROM at 4 wks	Severud et al, 2003
	Pendulum ex + PROM flexion x 6 wks. / AAROM - AROM at 6 wks / stretching at 12 wks	Watson et al, 2002
	Pendulum ex + PROM flexion + ER wks 1-3 / AAROM at wk 4	Brady et al, 2008
Strength	Isometric scapular ex. from 2-6 wks. / closed kinetic chain ex from 6-10 wks. / isometric to isotonic ex from 10-26 wks.	Baysal et al, 2005
	IR+ER (unloaded) - Day 1 / Isometrics flex + abd at 4 wks, / IR + ER with tubing at 8 wks. / eccentric IR + ER at 12 wks. (group 1)	Klintberg et al, 2009
	Isometrics flex + abd at 6 wks, / IR + ER with tubing at 16 wks. / eccentric IR + ER at 24 wks. (group 2)	
	Isometrics begun at wk. 2 / theraband added at 6 wks.	Hayes et al, 2004
	Begun at 6-8 wks	Hersch et al, 2000
	Begun when active flex >90° - usually 6-9 wks.	Ide et al, 2005
	Isometric strength ex at 6-8 wks / isotonic theraband ex. at 10-12 wks.	Kang et al, 2007
	Isometrics of scapular ms. 1-6 wks. / Begin RC isometrics at 6-8 wks. / Strengthening with resistance begun at 10 wks.	Millett et al, 2006
	Isometrics (submax, pain-free) flexion, ER, IR begun days 4-5 / scapular isometrics begun days 15-28 / theraband cuff, isotonic scapular ex wk 4-5 / isotonic strengthening at wks 5-6	Ghodadra et al, 2009
	Progressive strengthening with theraband begun at 6 wks	Sauerbrey et al, 2005
	Resisted ex at 12 wks	Severud et al, 2003
	Resisted shoulder + scapular ex at 12 wks	Watson et al, 2002
	Scapular stabilizer ex. wks 1-3 / resisted ER, IR, scapular retraction (isometric to theraband), wall push ups at wk 10	Brady et al, 2008
Return to Activity	ADL as able, strenuous manual labor or sport after 6 mos.	Hersch et al, 2000
	Heavy manual work + overhead activities allowed after "good restoration of shoulder strength"	Ide et al, 2005
	Gradual increase to full active use as tolerated after 3 mos.	Kang et al, 2007
	Return to strenuous work + recreational sport activities at wks 24-36	Ghodadra et al, 2009
	Full activity allowed at 5-6 mos. If full ROM and good function	Sauerbrey et al, 2005

(6%) responses were received. Although a low response, the survey was directed at PTs who identified that they had treated patients who had undergone the shoulder procedures of interest. Thus, it was not possible to determine what proportion of PTs was eligible to respond to the survey. Of respondents, 79% worked in private clinics and 37% had greater than 15 years of practice. Overall, most respondents (72%) reported treating one to five patients monthly following Bankart and/or Rotator Cuff repair. Most (62%) had received instructions from the

surgeon in a protocol format and 90% reported that they followed the protocol received. Overwhelmingly, respondents (97%) felt that *standardized* post-operative rehabilitation guidelines for patients who had undergone Bankart or Rotator Cuff repairs were important to extremely important. A large proportion (61%) also indicated that protocols were limiting and not applicable to all patients, especially those experiencing more complicated postoperative recovery. (Appendix 3)

**TABLE 2a. - ARTHROSCOPIC/MINI-OPEN ROTATOR CUFF REPAIR SURGEON PROTOCOLS**

Surgeon	Phase I	Phase II	Phase III	Phase IV	Comments
#1	<p><b>(Week 0-4)</b></p> <p>Sling to be worn at all times except for the following:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add</li> <li>• May remove 3-4 times/day for PT or in controlled settings</li> </ul> <p>Begin scapular stabilizer exercises (shld blade circles &amp; squeezes)</p> <p>Begin elbow, wrist &amp; hand ROM with shld kept in IR &amp; Add</p>	<p><b>(Week 4-8)</b></p> <p>Begin self assisted ROM as pain allows except Abd</p> <ul style="list-style-type: none"> <li>• Goal – 90° fwd elevation, 20° ER by week 6</li> <li>• Goal – 120° fwd elevation, 30° ER by week 8</li> </ul> <p>Progress scapular stabilizer strengthening</p> <p>Begin to wean sling (to be discontinued by end of week 6)</p>	<p><b>(Week 8-12)</b></p> <p>Begin AROM of shld as pain allows</p> <ul style="list-style-type: none"> <li>• No stretching allowed – ROM only in range achieved without stretching</li> <li>• Goal – 140° fwd elevation, 40° ER by week 12</li> </ul> <p>Begin isometric rotator cuff strengthening exercises</p> <ul style="list-style-type: none"> <li>• Fwd elevation, ER, IR, Add, Abd</li> </ul> <p>Continue scapular stabilization &amp; initiate proprioceptive exercises</p> <ul style="list-style-type: none"> <li>• AROM on stable scapular base</li> <li>• Correct SH rhythm with active elevation</li> <li>• Initiate closed chain ex. (prone on elbows, 4-point kneel, standing using wall as strength allows)</li> </ul>	<p><b>(Week 12+)</b></p> <p>Begin stretching in flexion, IR &amp; ER</p> <p>Continue rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• May begin resisted strengthening</li> </ul> <p>Continue scapular stabilizer strengthening</p> <p>Continue proprioceptive &amp; neuromuscular training</p>	<p>Return to heavy work/sport at 6 months (throwing at 6-8 months)</p>
#2	<p><b>Immobilization (0-6 weeks)</b></p> <ul style="list-style-type: none"> <li>• Remain in shld immobilizer for 4 weeks</li> <li>• May remove sling for physio, bathing and in controlled settings</li> <li>• Wean out of sling at 4-6 weeks</li> <li>• Pendular exercises</li> <li>• Self-assisted ROM, without limits, as pain allows except abduction (contraindicated)</li> <li>• Goal @ 4-6 wks of 140° flexion, 40° ER</li> <li>• No active motion of shld</li> <li>• Initiate scapular stabilization exercises (upper/*lower trapezius, serratus anterior)</li> <li>• Encourage active ROM of hand &amp; elbow</li> <li>• To begin general conditioning program of choice</li> </ul>	<p><b>Initial mobilization (6-10 weeks)</b></p> <ul style="list-style-type: none"> <li>• Shld immobilizer completely off by 6 weeks</li> <li>• AROM as pain allows – all planes</li> <li>• Gentle stretching into terminal ROM by <i>patient only</i></li> <li>• Progress scapular stabilization:</li> </ul> <p>*AROM on a stable scapular base</p> <p>*Correct scapulohumeral rhythm with active elevation</p> <p>*initiate close chain exercises (prone on elbows; 4 point kneel; standing, using wall, as anti-gravity strength allows)</p>	<p><b>Strengthening (10-26 weeks)</b></p> <ul style="list-style-type: none"> <li>• Begin progressive strength program</li> </ul> <p>*isometric strengthening</p> <p>*progress to isotonic strengthening within painfree ROM</p> <p>*close chain strengthening (eg. Wall push ups)</p> <p>*overhead strengthening once full ROM achieved &amp; pain well controlled</p> <p>*should not lift &gt;15 lb. unless specified by physician</p> <ul style="list-style-type: none"> <li>• Continue with stretching (therapist may now assist)</li> <li>• Joint mobilization now allowed</li> </ul>		<p>Associated SLAP repairs &amp; biceps tenodesis treat as above unless otherwise specified</p> <p>Protocol may be modified according to associated pathology or tear size</p>

#3	<p><b>(Week 0–6)</b> Sling to be worn at all times except for the following:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add</li> <li>• May remove 3-4 times/day for PT or in controlled settings</li> </ul> <p>Begin scapular stabilizer exercises (shld blade circles &amp; squeezes) Begin elbow, wrist &amp; hand ROM with shld kept in IR &amp; Add</p>	<p><b>(Week 6–8/10?)</b> Begin self assisted ROM as pain allows except Abd</p> <ul style="list-style-type: none"> <li>• Goal – 90° fwd elevation, 20° ER by week 6</li> <li>• Goal – 120° fwd elevation, 30° ER by week 8</li> </ul> <p>Progress scapular stabilizer strengthening Begin to wean sling (to be discontinued by end of week 6)</p>	<p><b>(Week 8/10?–12/14?)</b> Begin AROM of shld as pain allows</p> <ul style="list-style-type: none"> <li>• No stretching allowed – ROM only in range achieved without stretching</li> <li>• Goal – 140° fwd elevation, 40° ER by week 12</li> </ul> <p>Begin isometric rotator cuff strengthening exercises</p> <ul style="list-style-type: none"> <li>• Fwd elevation, ER, IR, Add, Abd</li> </ul> <p>Continue scapular stabilization &amp; initiate proprioceptive exercises</p> <ul style="list-style-type: none"> <li>• AROM on stable scapular base</li> <li>• Correct SH rhythm with active elevation</li> <li>• Initiated closed chain ex. (prone on elbows, 4-point kneel, standing using wall as strength allows)</li> </ul>	<p><b>(Week 12/14?+)</b> Begin stretching in flexion, IR &amp; ER Continue rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• May begin resisted strengthening</li> </ul> <p>Continue scapular stabilizer strengthening Continue proprioceptive &amp; neuromuscular training</p>	<p>Return to heavy work/sport at 6 months (throwing at 6 – 8 months)</p>
#4	<p><b>(Week 0–2)</b> *Sling and swath to be worn for 6 weeks post-operative Pendulum exercises AROM elbow, wrist, hand</p>	<p><b>(Week 2–6)</b> SAROM (no limits) Isometric RC strengthening Initiate periscapular conditioning</p>	<p><b>(Week 6–12)</b> Progress to AROM Progress RC strengthening Periscapular stabilizer strengthening/conditioning Restoration of normal scapulohumeral rhythm</p>		
#5	<p><b>(Week 1–2)</b> <u>Goal:</u> Allow pain &amp; inflammation to settle; avoid stiffness *Repair is adequate – immobilizer may be off, arm by side *Difficult/tenuous repair: keep arm abducted at all times *Pendulum ex. with scapula set *SAPROM in FE &amp; Ext *SAPROM in ER &amp; IR *Active only ER *Active ROM elbow/wrist/hand *Passive only elbow flex/forearm supination</p>	<p><b>(Week 3–6)</b> <u>Goal:</u> Establish reasonable ROM while protecting repair, keep pain control *Keep arm abducted until week____ *Continue with ROM as above until week 7 *Start isometric strengthening scapular motors week____ *Pendulum ex. focusing on stabilizing scapula *Commence isometric strengthening RC week____ *Commence isometric strengthening biceps/triceps week____ *Commence isometric strengthening trapezius, deltoid, pectoralis week____ *No abduction exercises</p>	<p><b>(Week 7–12)</b> <u>Goal:</u> Progress ROM and Strengthening *Active SA stretches GH joint stressing scapular stability *If pt. having difficulty with ROM, passive stretches as per sheet *Active scapular rehabilitation *Progress strengthening muscle groups as above to isotonic <i>when motion is improving and pain controlled</i> <b>*No resisted abduction or FE exercises</b></p>	<p><b>(Week 12 onward)</b> <u>Goal:</u> Functional Rehabilitation *Continue with stretches GH joint – NB. Posterior capsule *When able progress to plyometrics *Progress strengthening as pain allows <b>*No resisted abduction or FE exercises</b></p>	

#6	<p><b>(Week 0-6)</b> Sling to be worn at all times except for the following:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add</li> <li>• May remove 3-4 times/day for PT or in controlled settings</li> </ul> <p>Begin scapular stabilizer exercises (shld blade circles &amp; squeezes) Begin elbow, wrist &amp; hand ROM with shld kept in IR &amp; Add</p>	<p><b>(Week 6-8 / 10?)</b> Begin self assisted ROM as pain allows except Abd</p> <ul style="list-style-type: none"> <li>• Goal – 90° fwd elevation, 20° ER by week 6</li> <li>• Goal – 120° fwd elevation, 30° ER by week 8</li> </ul> <p>Progress scapular stabilizer strengthening Begin to wean sling (to be discontinued by end of week 6)</p>	<p><b>(Week 8/10?-12/14?)</b> Begin AROM of shld as pain allows</p> <ul style="list-style-type: none"> <li>• No stretching allowed – ROM only in range achieved without stretching</li> <li>• Goal – 140° fwd elevation, 40° ER by week 12</li> </ul> <p>Begin isometric rotator cuff strengthening exercises</p> <ul style="list-style-type: none"> <li>• Fwd elevation, ER, IR, Add, Abd</li> </ul> <p>Continue scapular stabilization &amp; initiate proprioceptive exercises</p> <ul style="list-style-type: none"> <li>• AROM on stable scapular base</li> <li>• Correct SH rhythm with active elevation</li> <li>• Initiate closed chain ex. (prone on elbows, 4-point kneel, standing using wall as strength allows)</li> </ul>	<p><b>(Week 12/14?+)</b> Begin stretching in flexion, IR &amp; ER Continue rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• May begin resisted strengthening</li> </ul> <p>Continue scapular stabilizer strengthening Continue proprioceptive &amp; neuromuscular training</p>	Return to heavy work/sport at 6 months (throwing at 6 – 8 months)
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**TABLE 2b. - ARTHROSCOPIC BANKART REPAIR SURGEON PROTOCOLS**

Surgeon	Phase I	Phase II	Phase III	Phase IV	Comments
#1	<p><b>(Week 0-6)</b> *Sling to be worn at all times except for the following:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add.</li> <li>• May remove 3-4 times/day for elbow, wrist and hand ROM with shld kept in IR &amp; Add.</li> </ul> <p><b>No active or passive movement of the shoulder allowed</b></p>	<p><b>(Week 6-10)</b> Initial Mobilization/Strengthening *Discontinue sling *Begin AROM, assisting as needed. <b>No stretching of the shoulder beyond the boundary achieved with active ROM</b> *Begin scapular strengthening ex. *Begin proprioceptive &amp; neuromuscular training exercises within active ROM limits</p>	<p><b>(Week 10-14)</b> *Begin stretching in flexion &amp; IR</p> <ul style="list-style-type: none"> <li>• No stretching in ER</li> </ul> <p>*Begin rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• Isometrics first, progress as tolerated</li> </ul> <p>*Continue scapular stabilizer strengthening *Continue proprioceptive &amp; neuromuscular training</p>	<p><b>(Week 14-36)</b> *May begin stretching in ER &amp; Add</p> <ul style="list-style-type: none"> <li>• No stretching in ER &amp; Abd</li> </ul> <p>*Continue RC &amp; scapular stabilizer strengthening *Continue proprioceptive &amp; neuromuscular training</p>	Return to heavy work/sport at 6 months (throwing at 6-8 months)
#2	<p><b>(Week 0-6)</b> *Sling worn at all times except:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add.</li> <li>• May remove 3-4 times/day for elbow, wrist and hand ROM with shld kept in IR &amp; Add.</li> </ul> <p><b>No active or passive movement of the shoulder allowed</b></p>	<p><b>(Week 6-10)</b> Initial Mobilization/ Strengthening *Discontinue sling *Begin AROM, assisting as needed. <b>No stretching of shoulder beyond boundary achieved with active ROM</b> *Begin scapular strengthening ex. *Begin proprioceptive &amp; neuromuscular training ex's. within active ROM limits</p>	<p><b>(Week 10-14)</b> *Begin stretching in flexion &amp; IR</p> <ul style="list-style-type: none"> <li>• No stretching in ER</li> </ul> <p>*Begin rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• Isometrics first, progress as tolerated</li> </ul> <p>*Continue scapular stabilizer strengthening *Continue proprioceptive &amp; neuromuscular training</p>	<p><b>(Week 14-36)</b> *May begin stretching in ER &amp; Add</p> <ul style="list-style-type: none"> <li>• No stretching in ER &amp; Abd</li> </ul> <p>*Continue RC &amp; scapular stabilizer strengthening *Continue proprioceptive &amp; neuromuscular training</p>	Return to heavy work/sport at 6 months (throwing at 6-8 months)



#3	<p><b>(Week 0–6)</b></p> <p>*Sling to be worn at all times except for the following:</p> <ul style="list-style-type: none"> <li>• May remove to wash under arm – shld kept in IR &amp; Add.</li> <li>• May remove 3-4 times/day for elbow, wrist and hand ROM with shld kept in IR &amp; Add.</li> </ul> <p><b>No active or passive movement of the shoulder allowed</b></p>	<p><b>Initial Mobilization/Strengthening (Week 6–10)</b></p> <p>*Discontinue sling</p> <p>*Begin AROM, assisting as needed.</p> <p><b>No stretching of the shoulder beyond the boundary achieved with active ROM</b></p> <p>*Begin scapular strengthening ex.</p> <p>*Begin proprioceptive &amp; neuromuscular training exercises within active ROM limits</p>	<p><b>(Week 10–14)</b></p> <p>*Begin stretching in flexion &amp; IR</p> <ul style="list-style-type: none"> <li>• No stretching in ER</li> </ul> <p>*Begin rotator cuff strengthening</p> <ul style="list-style-type: none"> <li>• Isometrics first, progress as tolerated</li> </ul> <p>*Continue scapular stabilizer strengthening</p> <p>*Continue proprioceptive &amp; neuromuscular training</p>	<p><b>(Week 14–36)</b></p> <p>*May begin stretching in ER &amp; Add</p> <ul style="list-style-type: none"> <li>• No stretching in ER &amp; Abd</li> </ul> <p>*Continue RC &amp; scapular stabilizer strengthening</p> <p>*Continue proprioceptive &amp; neuromuscular training</p>	<p>Return to heavy work/sport at 6 months (throwing at 6 – 8 months)</p>
#4		<p><b>(Week 6–12)</b></p> <p>GOAL: Restore normal scapulo-humeral rhythm</p> <ul style="list-style-type: none"> <li>• Begin strengthening/resistance with primary focus on the rotator cuff and scapular stabilizers</li> </ul>	<p><b>Progression to Full Range (Week 12–24)</b></p> <p>*Begin stretching into flexion, ER (0° abduction) and IR</p> <ul style="list-style-type: none"> <li>• <i>No stretching in apprehension position allowed</i></li> <li>• Continue strength, endurance, proprioception and neuromuscular training</li> <li>• Return to sport/work in 4-6 months</li> </ul>		
#5	<p><b>(Week 0–4)</b></p> <p>*Patient immobilized in a sling (add/IR)</p> <p>*May commence isometric ex. for all ms groups about the shld</p> <p>*May remove sling 3 times/day for active elbow ex., (shld IR)</p> <p>*Grip strength maintained by squeezing soft ball</p> <p>*May begin showering once sutures removed (shld add/IR)</p> <p>*Clothes worn on top of sling for first 2 weeks (day &amp; night) then may carefully place arm into sleeve of shirt and wear sling outside of clothing (button up shirts only under sling)</p>	<p><b>(Week 6–10)</b></p> <p>*Discharge sling</p> <p>*Progress flexion and rotation ROM</p> <p>*Initiate circumferential rotator cuff stretches (including posterior &amp; inferior stretches)</p> <p>*Avoid apprehension position (90° abduction/ER)</p> <p>*Progress strengthening to free weight and upper body ergometer work, beginning with low resistance</p>	<p><b>(Week 10–16)</b></p> <p>*Full ROM allowed</p> <p>*Continue strengthening, especially IR/ER and scapulothoracic rhythm</p> <p>*May resume non-contact sports and swimming (breast stroke &amp; short stroke freestyle)</p>	<p><b>(Week 16–24)</b></p> <p>*Continue strengthening and stretching of shoulder</p> <p>*May return to contact sport when fully rehabilitated with respect to motion, strength and demonstrated endurance capacity (usually not until 6 months post-surgery)</p>	

	<p><b>(Week 4-6)</b></p> <p>*Sling may be removed for increasing periods through the day provided there is no risk of injuring arm</p> <p>*AROM initiated with goals of 90° flexion / 0° ER (&gt;0° contraindicated)</p> <p>*Commence graded strengthening program with theraband emphasizing IR and ER and flexion/extension with shld in adduction</p>				
#6	<p><b>(Week 0-2)</b></p> <p>*Sling to be worn for 6 weeks</p> <p>Pendulum exercises</p> <p>AROM elbow, wrist, hand</p> <p>May start SAROM with following restrictions:</p> <ul style="list-style-type: none"> <li>• ER &lt; 45°</li> <li>• Abd &lt; 60°</li> </ul> <p>Isometric RC strengthening</p> <p><b>(Week 2-6)</b></p> <p>SAROM with following limits:</p> <ul style="list-style-type: none"> <li>• ER &lt; 45°</li> <li>• Abd &lt; 90°</li> </ul> <p>Progress to AROM with same limits</p> <p>RC strengthening</p> <p>Initiate periscapular stabilizer strengthening</p>	<p><b>(Week 6+)</b></p> <p>Restoration of normal scapulo-humeral rhythm</p>			

Shoulder Guideline Formatting: Based on the input obtained through the focus groups and on-line survey, the draft shoulder guidelines, underwent further revision. The final draft of each guideline was reviewed and agreed upon by all SURGE members who had developed the content.

Development of On-line Information Resource: An on-line information resource, linked to the two shoulder guidelines was developed to provide PTs with information on how to interpret and use the new guidelines. Video demonstrations of proper exercise techniques and key outcome measures used to determine patients' progression were also included. The website link appears visibly on the bottom of the post-operative guidelines in addition to being accessible through links to the Faculty of Rehabilitation Medicine, PT Alberta and CORE websites.

#### **Chapter IV. REHABILITATION GUIDELINES OUTLINE**

The post-operative Bankart and Rotator Cuff rehabilitation guidelines are similar in format and structure. (Appendix 4) Initial key information on the patient and surgical procedure performed, as well as additional details the surgeon thinks should be communicated to the treating PT are provided at the top of the first page. Both guidelines are divided into three phases with a title indicating the primary goal and a suggested timeframe.

Each phase has three separate sections: 1) Goals, 2) Specific Treatment Interventions and 3) Criteria for Progression (CFP). Section one is divided into three subsections: "Primary Goals", "Secondary Goals" and "Cautions", based on discussions amongst SURGE and feedback from the PT survey. Section two is similarly divided into "Primary" and "Secondary" treatment interventions. The CFP section provides specific goals that should be met before proceeding to the next phase.

Positive outcomes, following a Bankart and/or Rotator Cuff repair, occur as a result of the surgical intervention AND post-operative rehabilitation that protects healing tissue and promotes shoulder girdle mobility, strength and function. Our interdisciplinary clinical research group underwent an extensive process

to develop standardized, evidence-informed and consensus-derived rehabilitation guidelines for patients who undergo these common shoulder surgeries. The goal was to provide a common platform from which PTs, physicians and orthopedic surgeons can communicate and manage patients who have had shoulder surgical procedures, ultimately leading to improved patient care. Standardized management of these patients will allow for better comparative analysis of surgical procedures and evaluation of rehabilitation effectiveness and patient outcomes.

#### *Chapter IV.A.*

#### *Post-operative Arthroscopic Bankart Repair Rehabilitation Guideline*

#### Surgical Procedure

Post-traumatic anterior shoulder instability occurs due to the presence of an anterior labral detachment (Bankart lesion), which results in the compromise of the static stabilizers of the anterior shoulder, specifically the antero-inferior and middle glenohumeral ligaments. Arthroscopic Bankart repair aims to stabilize the shoulder through the reattachment of the labrum to the glenoid and tensioning of the anterior glenohumeral ligaments, also known as a capsular shift. Since its introduction over thirty years ago, there has been a gradual evolution of the technique, with improvements in the instrumentation, the methods of fixation, and the surgical technique. There has also been the recognition that the presence of both glenoid and humeral bone loss can compromise the success of an isolated arthroscopic Bankart repair. This has led to the greater use of alternative procedures, such as a Latarjet, or an augmented arthroscopic stabilization incorporating a Remplissage, or infraspinatus tenodesis, to the arthroscopic Bankart repair. Due to the number of factors that need to be considered when approaching post-traumatic anterior instability, clarity and consensus over the goals and cautions of the rehabilitation protocol is critically important.

**TABLE 3: PHYSICAL THERAPIST FOCUS GROUP FEEDBACK**

Do you follow/use post-op protocols when treating patients who have had shoulder surgery? Why/why not?	If you could design your own shoulder protocol, what would it look like? What specifically would you include in it?	What key outcome measures would you use to guide the progression of a patient who has had shoulder surgery? Specific Examples?
<p>Generally - for reference to timelines but vary it from patient to patient</p> <p>Good reference, want to follow surgeon's ideas if possible</p> <p>Limitations are they don't account for patient variability - compliance, physical fitness, posture, pre-op condition, past history, age, understanding of exercises, other MSK issues like Csp and Tsp</p> <p>Frustrating because different surgeons have different protocols e.g. immediate AAROM to no ROM for 6 wks</p> <p>Frustrating; different surgeons have different guidelines + timeframes therefore have to look at protocol for each patient</p> <p>To prevent confusion with patient between what surgeon says and not to "undo" the surgical procedure</p> <p>Limitations are pt. who is progressing better than average - are protocols keeping these pt.'s progress back?</p> <p>Helpful to know timeframes for healing</p> <p>Guides patient and PT re: expectations</p> <p>Limitations are not knowing what the protocol means and managing patients that are "speedy" - protocol is limiting</p> <p>Follow protocols but will stretch these a bit if patient presenting better/improving</p> <p>Treat patient holistically - include protocol but add to it</p> <p>Use clinical decision making "rules of engagement"</p> <p>Follow rotator cuff protocols more closely particularly if there is a major precaution</p> <p>Protocols remind me of timelines so that is good</p> <p>Definitely follow bold letters i.e. NO Stretching</p> <p>Don't follow to a tee</p> <p>Would vary on timelines based on clinical observations</p> <p>Very vague e.g. isometric strengthening, what ranges?</p> <p>All Bankart repairs received same protocol - are they all the same? Pts. definitely not the same</p> <p>Don't typically receive a protocol</p> <p>Follow the surgeon letter / notes</p> <p>Helpful as a guideline</p> <p>Limiting in their variability between surgeons</p> <p>Details are vague</p> <p>Non-specific to each patient</p> <p>Protocols vary too much from surgeon to surgeon</p> <p>Too conservative, vague</p> <p>Poor compliance by patient</p> <p>Helpful for precautions/yellow and red flags</p> <p>Helpful to set goals with timelines</p> <p>As a guide to knowing what the surgeon did</p> <p>Specifics of each stage of the recovery are helpful</p> <p>Limitations are that they are poorly written with very restricting suggestions</p> <p>Doctor created these based on their surgical procedure and since direct communication is usually minimal these help</p>	<p>Preferred timelines on passive progressing to active to resisted (guidelines)</p> <p>Knowledge of pathology and what was used in surgery</p> <p>Do's/Don'ts &amp; Why Not's with timelines</p> <p>A "range" within protocols to then apply to individual patient</p> <p>Opportunity to use clinical judgment to apply to specific patients (prefer guidelines approach rather than protocol)</p> <p>Type of surgery (brief info re: any variances and absolute contraindications)</p> <p>Timelines (guidelines better on earliest and latest initiation of exercises/techniques, i.e. 2-4 wks.)</p> <p>Immobilization length guidelines</p> <p>ROM (how to start; AAROM to AROM, range limitations)</p> <p>Strengthening (isom/conc/eccen; when to start weights vs. tube, etc.)</p> <p>Stabilization exercises - when to start</p> <p>Functional RTW/RTS-when?</p> <p>Qualification whether patient has potential to fast track, routine or fragile repair - go slow so therapist can use own judgment to apply to the pt.</p> <p>Guidelines for progressing</p> <p>Base it on healing timeframes and function</p> <p>Progress pt. on performance not necessarily weeks post-op</p> <p>Signs for returning pt. to surgeon</p> <p>Knowledge of pathology and history of patient</p> <p>Examples listed by exercises</p> <p>Checklist of readiness to progress to next phase split into essential and interpretable guides</p> <p>CI vs. precautions for each phase</p> <p>Specific exercise examples (top 5)</p> <p>More specific detail about the surgery</p> <p>More of a checklist format and more choices so it can be more customized</p> <p>Consistent protocols</p> <p>Precautions / specific contraindications to activity and exercises and the timelines associated with these</p> <p>Contact number if there are any problems</p> <p>Goals for ROM and strength and those timelines</p> <p>May include few examples of exercises for each stage</p> <p>Contraindications from the surgeon</p> <p>Expectations - short and long term</p> <p>Big bold letters for most important info</p>	<p>Pain</p> <p>Swelling</p> <p>Comfort</p> <p>Posture</p> <p>Associated movements in scapular, cervical, thoracic, elbow, etc.</p> <p>Return to sport/work needs:</p> <p>Satisfaction (WNL) ROM</p> <p>Full or very near full strength</p> <p>Proper SH biomechanics and muscle balance</p> <p>Relatively pain free (night, at rest, ADL)</p> <p>Immobilization</p> <p>Resting pain levels &amp; healing timeframes</p> <p>Scapular support around shoulder ROM</p> <p>When AAROM is safe/stable/good support</p> <p>Strength</p> <p>Able to do prescribed ex. ie. 3 x 10 painfree</p> <p>Painfree isometric → AROM → RI</p> <p>Return to Activity/Work</p> <p>Baseline strength measures</p> <p>FCE / work tasks &amp; demands</p> <p>Pain limits</p> <p>Age of patient</p> <p>Type of surgery done</p> <p>ROM</p> <p>Tissue healing times</p> <p>Type of surgery done</p> <p>Strength</p> <p>Achieving appropriate biomechanics for progression of strengthening</p> <p>Return to activity/work</p> <p>Comparison to other side</p> <p>Outcome measures for normal population</p> <p>Type of activity</p> <p>Immobilization</p> <p>Procedure</p> <p>No pain/minimal soreness</p> <p>Minimally functional AROM/AAROM decreasing</p> <p>Has been "active" at home without any concerns</p> <p>ROM</p> <p>Timeline</p> <p>Pain behavior</p> <p>Procedure done</p> <p>Strength</p> <p>Procedure</p> <p>Timeline</p> <p>Return to Activity/Work</p> <p>Timeline</p> <p>Pt. has no significant concerns</p> <p>Pain</p> <p>AROM</p> <p>Strength</p> <p>Functional score</p>

## PHASE 1: IMMOBILIZATION

### Goals

Primary goals of phase 1 include protecting the healing capsulolabral tissue and reducing post-operative pain and inflammation. Secondary goals include protected glenohumeral (GH) joint range of motion (ROM) and strength, scapulothoracic stabilization and addressing the kinetic chain. (i.e. adjacent joints, posture re-education).

Patients are cautioned against doing any active or passive movement beyond the specified ROM, especially external rotation, and are not allowed to do any heavy lifting, pushing, pulling or use of the affected arm beyond the ROM specified.

### Specific Treatment Intervention

Patients are immobilized in a sling and swath during the initial post-operative phase, removing it for washing and exercises. Modalities such as ice and electrophysical agents may be used for pain relief. Patient education on adherence to immobilization, managing pain, sleep and rest positions are all important during this initial phase.

Protected GH joint ROM and scapulothoracic strength exercises can be performed with dosage dictated by pain and ability to perform the exercise without compensation. ROM is typically restricted to 30 degrees of elevation (flexion and scaption) in neutral rotation and is performed active-assist. Strength exercises are performed isometrically, with the shoulder in an adducted and slightly internally rotated position. Scapulothoracic mobility and strength are emphasized during this phase along with the entire upper extremity kinetic chain. Cervical, thoracic and lumbar spine mobility and stability are managed as indicated. Finally, patients are advised to begin or continue cardiovascular exercise (e.g., stationary, recumbent cycling or walking) that can be done with the shoulder supported in the sling.

### Criteria for Progression to Phase II

The decision to progress a patient is made through consideration of time from surgery as well as fulfilling phase-specific criteria. In the

Bankart repair guideline, progression to Phase II can occur when patients have demonstrated good adherence to shoulder immobilization with minimal pain at rest and correct scapular positioning with their arm at their side.

## PHASE 2: INITIAL MOBILIZATION AND STRENGTHENING

### Goals

Phase II aims to increase GH joint ROM and improve shoulder girdle strength and control. Consideration of the healing capsulolabral tissue and pain is still important. Secondary goals include increased functional activities and integration of the kinetic chain.

### Specific Treatment Intervention

Immobilization is discontinued and ROM exercises progress from active-assist to active when the patient is able to move through range without pain and/or compensation. Isometric exercises may be progressed to isotonic, avoiding long lever and abduction/external rotation positions. Scapular stabilization exercises progress to include both static and dynamic movements. All shoulder girdle strength exercises must be performed with proper spine posture and a stable scapula and progressed when the patient can maintain this position while performing the exercise. A combination of both open- and closed-kinetic chain exercises should be used.

### Criteria for Progression

Progression to Phase III occurs at approximately 12 weeks post-operatively, as long as the patient is able to actively elevate his/her shoulder to a minimum of 120 degrees of scaption with minimal pain and proper scapulohumeral rhythm. The patient should be able to perform the prescribed dosage of strength exercises, demonstrating proper technique and without reproducing pain and/or symptoms. Strength measures should be improved substantially at the end of Phase II. Finally, the patient should report an overall increase in the use of his/her affected arm in functional, daily activities.

PHASE 3: STRENGTHENING AND  
RETURN TO ACTIVITY

Goals

The main goals of the final phase are to improve and normalize shoulder girdle neuromuscular strength, endurance and proprioception as well as restore full, functional GH joint ROM and the entire upper extremity kinetic chain. Secondary goals include return to all daily activities, work and recreation. Cautions remain regarding stretching the shoulder into abducted/externally-rotated positions and using the arm for heavy lifting, pushing and pulling, especially in these same GH joint positions.

Specific Treatment Intervention

Strengthening should include all the shoulder girdle musculature, especially scapular stabilizers and rotator cuff muscles. Progressions towards performing strength exercises at increasing shoulder heights, in combined, functional movement patterns with dosage considerations that reflect both strength and endurance goals should occur. Both open and closed chain exercises should be emphasized with progression features like speed, reaction time, and proprioception. ROM goals should be met through joint mobility and soft tissue stretching as indicated. If stretching into external rotation, particularly overhead, is required, it must be done carefully to protect the surgically repaired tissue. Activity and patient-specific exercises are important to address functional goals required for full return to daily activities, work and recreation.

Criteria for Progression to RTA  
or Home Program

Patients are considered appropriate for discharge if the strength and endurance of their shoulder girdle musculature is at a level equal or better than the unaffected side. They should demonstrate proper, symmetrical scapular control statically and dynamically through full, functional GH joint ROM. Patients should be engaged in all activities of daily life and have returned to work. Most patients are able to return to their recreational and/or sport activity unless restricted by the surgeon.

*Chapter IV.B.*  
*Post-operative Rotator Cuff Repair*  
*Rehabilitation Guideline*

Surgical Procedure

Patients with rotator cuff disease, specifically rotator cuff tears that have failed appropriate non-operative treatment, may be candidates for a repair of the rotator cuff. The repair may be performed via an open incision or entirely using arthroscopic techniques. In the majority of cases, the surgeons who participated in the creation of these consensus guidelines perform the repair using either mini-open or all arthroscopic techniques. In both cases, a diagnostic arthroscopy is performed to evaluate the glenohumeral joint and the subacromial space. Mini-open RC repair requires a 3-4 centimeter incision over the site of the rotator cuff tear. The deltoid is then split inline with its fibers, and the repair of the tear is performed using sutures through bone tunnels, suture anchors, or a combination of the two. Following completion of the repair, the deltoid is reapproximated using interrupted sutures and the skin is closed in layers. An all-arthroscopic repair involves repairing the torn rotator cuff through arthroscopic portals made in the skin and deltoid. Again, sutures through bone, suture anchors, or a combination of the two, are used to repair the rotator cuff. Unlike a mini-open repair, there is less violation of the deltoid. Theoretically, the use of all arthroscopic techniques may result in less scarring and patient morbidity, however the literature has not found a convincing clinical difference between the two procedures. As such, both are considered appropriate techniques for repairing rotator cuff tears, with the choice often dictated by the preference and skill of the treating surgeon.

PHASE 1: IMMOBILIZATION

Goals

The primary goals following a rotator cuff repair are to optimize and protect the healing musculotendinous tissue and decrease the associated pain and inflammation. Secondarily, patients are encouraged to perform protected GH joint ROM, scapulothoracic stabilization and kinetic chain exercises (i.e. adjacent

joints, posture re-education). No PT assisted stretching and/or passive ROM is allowed nor is specific strengthening or loading of the GH joint external rotators and/or abductors. Patients are cautioned against doing any lifting, pushing and/or pulling with their affected arm.

#### Specific Treatment Intervention

Patients are immobilized in a traditional sling and swath for approximately four to six weeks following a standard rotator cuff repair. This may vary depending on the extent of the tear and subsequent repair as well as whether additional surgical intervention(s) were performed. Patients are encouraged to remove their sling for washing, PT exercises and simple ADLs, providing these activities can be done pain free. Patients are guided through pendular and active-assist ROM exercises with the exception of motions into abduction and/or hand behind the back. Scapular setting exercises can be performed in sitting with the shoulder supported at the side in adduction and IR or by the sling. Upper extremity joint ROM as well as cervical/thoracic spine ROM and posture exercises should also be performed. Patients are encouraged to participate in cardiovascular exercise providing it can be done with the arm protected.

#### Criteria for Progression

To progress, patients must have demonstrated good adherence to shoulder immobilization with significant reduction in pain and correct scapular positioning with arm at their side.

#### PHASE 2: INITIAL MOBILIZATION AND SCAPULAR MUSCLE RETRAINING

##### Goals

The primary goals are to increase GH joint ROM and improve shoulder girdle neuromuscular strength and control. Protection of the healing musculotendinous tissue remains a priority, as does minimizing or controlling pain. Secondary goals include increasing functional activities and integrating the kinetic chain in exercises. Cautions remain against passive shoulder stretching, unless directed

by the surgeon and isolated loading of the shoulder through active abduction ROM.

#### Specific Treatment Intervention

Immobilization is discontinued. Patients may progress from active-assist to active ROM exercises, in all planes, including abduction. Quantity AND quality of scapulohumeral motion is emphasized. The patient may do gentle stretching into terminal ROM unless otherwise directed by the surgeon. Scapular stabilization exercises are progressed and should be incorporated with trunk and upper extremity kinetic chain exercises. All scapular strength exercises should be pain free with proper spine and scapular positioning and only be progressed when patients can maintain this position during the exercise. A combination of open- and closed-kinetic chain exercises should be included.

#### Criteria for Progression to Phase III

To progress to Phase III, patients must be able to actively elevate the shoulder to a minimum of 120 degrees of flexion and externally rotate to 40 degrees with minimal to no pain and proper scapulohumeral rhythm. Strength testing should demonstrate a significant improvement by the end of Phase II and patients should report increased use of their arm in most activities of daily life, with an overall decrease of pain.

#### PHASE 3: STRENGTHENING

##### Goals

The final phase culminates in discharge with the primary goals of restoring full, functional ROM of the GH joint and entire upper extremity kinetic chain, normal shoulder girdle neuromuscular strength, endurance and proprioception. Secondarily, patients should be at or near full return to all daily activities, work and recreational activities. Caution is still observed in overhead positions that can cause impingement as well as heavy lifting, pushing and/or pulling with the surgically repaired arm.

## Specific Treatment Intervention

ROM and stretching exercises are continued with a strong focus on combined, functional movement patterns. PT assisted soft tissue stretching and joint mobilization techniques may be performed, if indicated, and not contraindicated by the surgeon. Shoulder girdle strengthening exercises are emphasized for both scapular stabilizers and rotator cuff muscles. Contractions should begin with isometrics in neutral joint positions progressing to various positions and then isotonic contractions. Isotonic exercises should begin with flexion in the scapular plane and progress to abduction with low load and short lever arm only. Isolated muscle contractions should progress to combined muscle and functional movement patterns. Dosage should reflect strength and endurance goals. Functional, open- and closed-kinetic chain exercises involving the entire upper extremity kinetic chain and trunk should be emphasized as well as activity-specific exercises to address individual patient functional goals for ADL, work and recreational activities.

## Criteria for Return to Activity and/or Home Program

At the end of this phase the patient has achieved full, functional, pain free GH joint ROM with proper scapulohumeral rhythm. Shoulder girdle muscle strength and endurance should be significantly improved to a level that allows patients to return to daily and light sport/recreational activity. The return to heavy work and/or vigorous sporting activity is typically delayed until six to eight months post-operatively.

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### Appendix I.

#### LITERATURE REVIEW SEARCH TERMS

Search terms varied depending on the database used. Pubmed, for example, was searched using the following key words: protocol OR pathway OR guideline, shoulder joint. Medline was searched using key terms such as, shoulder\* AND (protocol OR pathway OR guideline) AND rehabilitat\*. Other terms that were trailed in the search were, shoulder, SLAP, Bankart, Rotator Cuff, Rehabilitation, Post-surgical and Post-operative. Pubmed (Restricted) was searched using search terms including, slap lesion\$ (patholog\$ or etiolog\$ or aetiolog\$ or incident\$ or mechanism). Additionally, a detailed search on Embase was

conducted with the following key terms being used, slap lesion\$ (patholog\$ or etiolog\$ or aetiolog\$ or Medline, PubMed, Cinahl and Scopus were also searched using the following key words: shoulder joint, SLAP, arthroscopy (+truncation), surgery (+truncation), repair, outcomes and function.

### Appendix II. SURVEY I QUESTIONS

#### PT Demographic Questions

1. What type of facility(s) do you work in? (Hospital IP, Hospital OP, Private Clinic, Home Care, WCB, Rehabilitation Hospital...)
2. How many years have you been working as a PT? 0–2 YRS; 3–5 YRS; 6–10 YRS; 10–15 YRS; >15 YRS
3. Gender
4. Highest level of degree obtained? (BScPT, MScPT, Diploma, other)
5. In a typical month, how many patients would you see that have had a Bankart and/or Rotator Cuff repair of their shoulder? None; 0–5 pts.; 5–10; 10–15; 15+

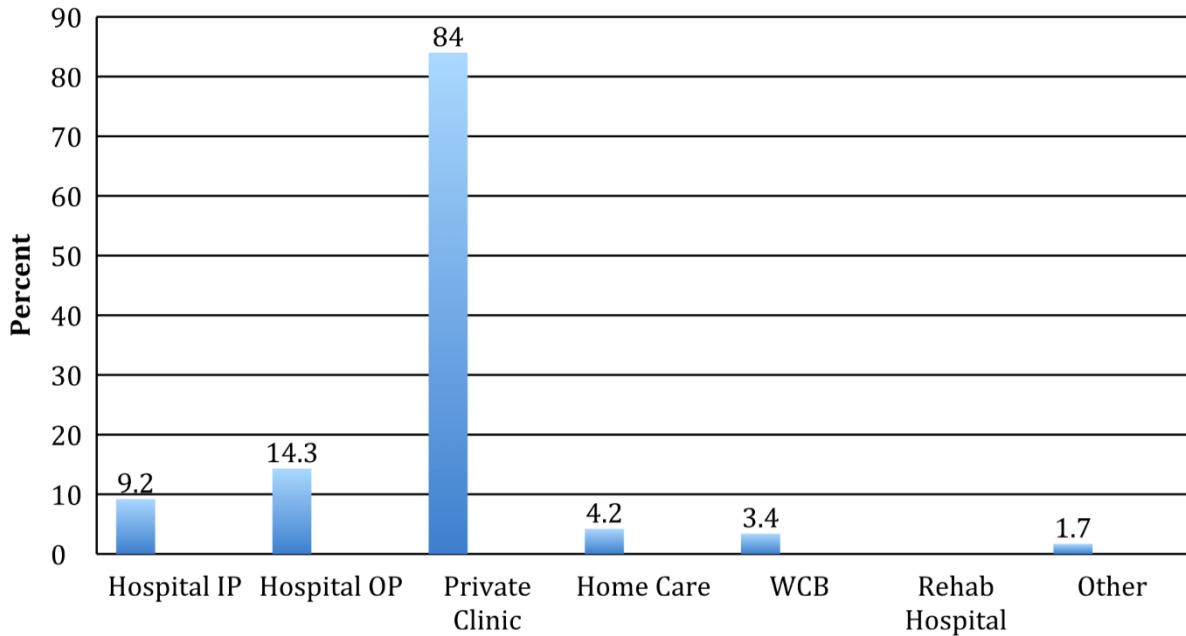
#### Survey Questions

6. When treating a patient who has had a Bankart and/or Rotator Cuff surgical repair, how frequently would you receive instructions from the surgeon about the post-operative management of the patient? (Never → All the time)
7. When treating a patient who has had a Bankart and/or Rotator Cuff repair of their shoulder, how frequently would the instructions from the surgeon about the post-operative management of the patient be in the form of a post-op protocol? (Never → All the time)
8. When treating a patient who has had a Bankart and/or Rotator Cuff repair of their shoulder, how often do you follow/use the post-op protocol that you have been given? (Never → All the time)
9. How well do you think post-op Bankart and/or Rotator Cuff repair protocols promote patient-specific, clinical decision-making? (Not at all → Extremely well)
10. Rate the level of agreement with the following statements regarding post-op Bankart and/or Rotator Cuff repair protocols: (Strongly Disagree → Strongly Agree)

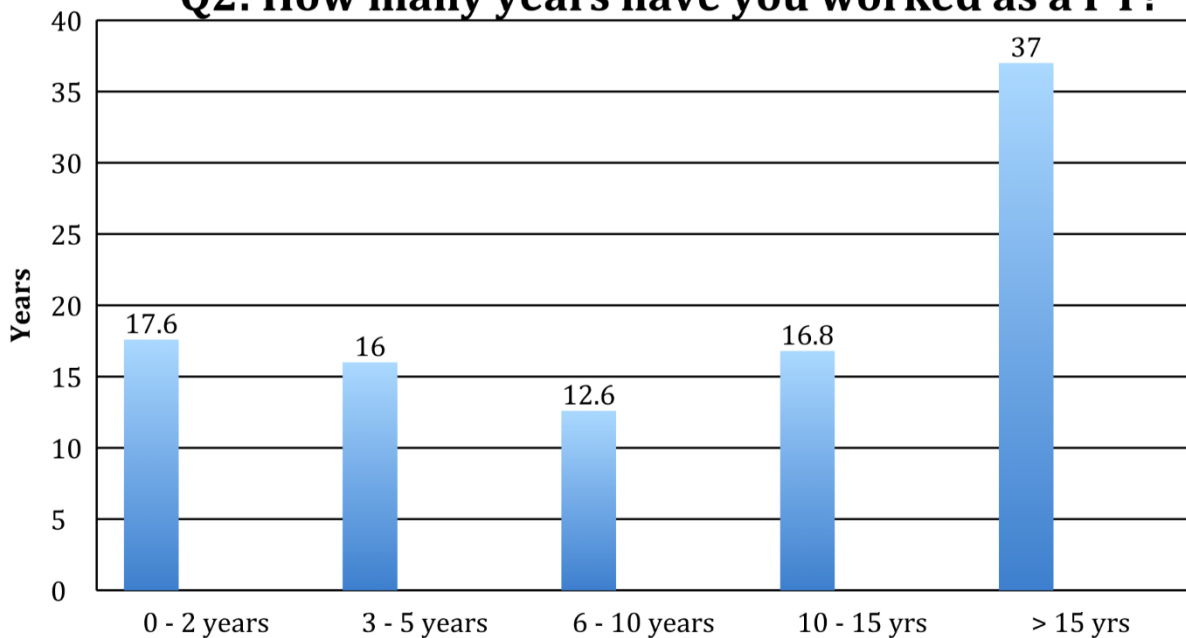
- a. My patients do not always present the way the protocol suggests they should
  - b. I always follow the protocol because I do not want to contradict the surgeon
  - c. Protocols are limiting; they do not apply to all patients, especially those that progress quickly
  - d. Protocols are limiting; they do not apply to all patients especially those with complications that progress slowly
  - e. The information about specific treatments provided on post-op shoulder protocols is sufficient
  - f. Protocols differ from surgeon to surgeon and it is hard to know which one is best to follow
  - g. Sufficient information is included about the shoulder surgical procedure performed
  - h. Protocols are difficult to understand
  - i. Protocols promote clinical decision making
  - j. Protocols provide enough information on contraindications and precautions
  - k. I use shoulder protocols as a guide only and adjust them as needed according to my patient
11. How frequently do you need to contact the referring surgeon for additional information regarding the management of the patient who has had a Bankart and/or Rotator Cuff repair of their shoulder? (Never → All the time)
12. If you have contacted the referring surgeon regarding the management of a patient(s) who has had a Bankart and/or Rotator Cuff repair of their shoulder, what was the reason(s)? (Open-ended)
13. On average, what percentage of patients you have seen following a Bankart and/or Rotator Cuff repair of their shoulder developed post-operative complications (i.e. infection, adhesive capsulitis, disruption of repair, rotator cuff tendonopathies)? None; 0–2%; 3–5%; 6–10%; 10+%
14. Which 3 outcome measures/indicators do you use most often when progressing your post-op Bankart and/or Rotator Cuff repair patients from one phase to the next?
- i. Pain
  - ii. Functional outcome measures
  - iii. Time from surgery
  - iv. Shoulder range of motion
  - v. Swelling
  - vi. Surgeon recommendation
  - vii. Shoulder Strength
  - viii. Tissue healing timeframes
15. How important is it to you that post-operative shoulder protocols provide the following information: (Rank the 3 that are most important to you)
- a. Specific timelines for when to progress patients from one protocol phase to the next
  - b. Specific goals for each protocol phase
  - c. Information regarding the specific surgical procedure done
  - d. Information regarding the specific patient (e.g. secondary conditions and/or injuries) that would predict whether patient is expected to follow the standard protocol or not
  - e. Specific exercise suggestions and descriptions
  - f. Criteria for progressing patients from one phase to the next (other than timeframe)
  - g. Specific “Do’s and Don’ts”
  - h. Information regarding how and when to return patients to work/sport
16. How important is it to you that there are standardized post-operative rehabilitation guidelines for the management of patients who have had a Bankart and/or Rotator Cuff repair? (Not at all → Extremely important)

**Appendix III.  
SURVEY I RESULTS**

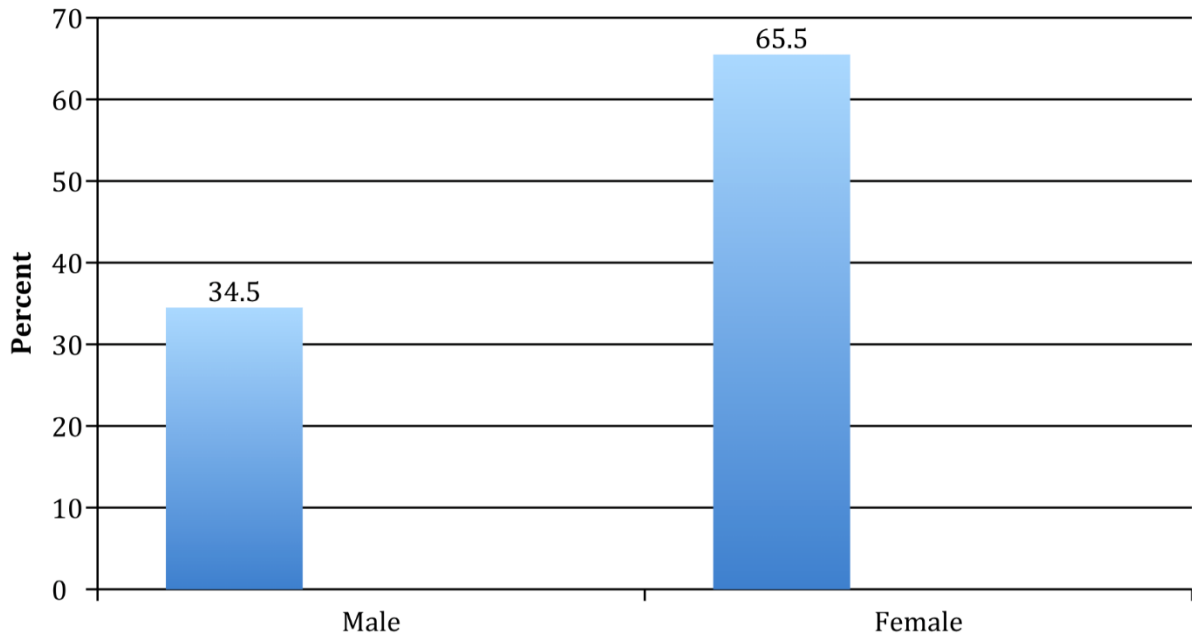
**Q1: What type of facility do you work in?**



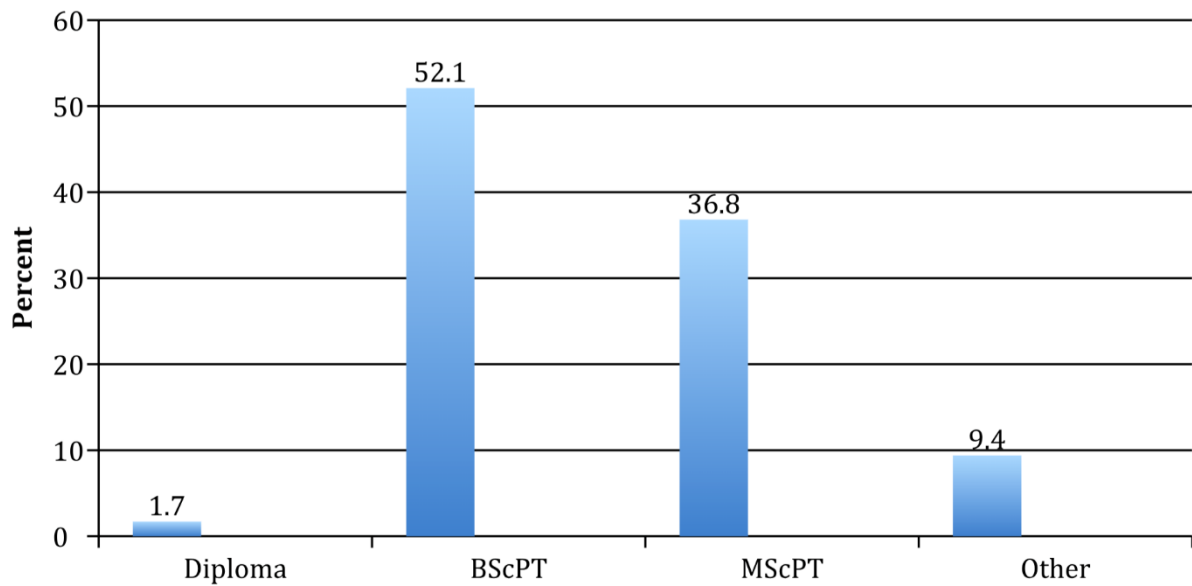
**Q2: How many years have you worked as a PT?**



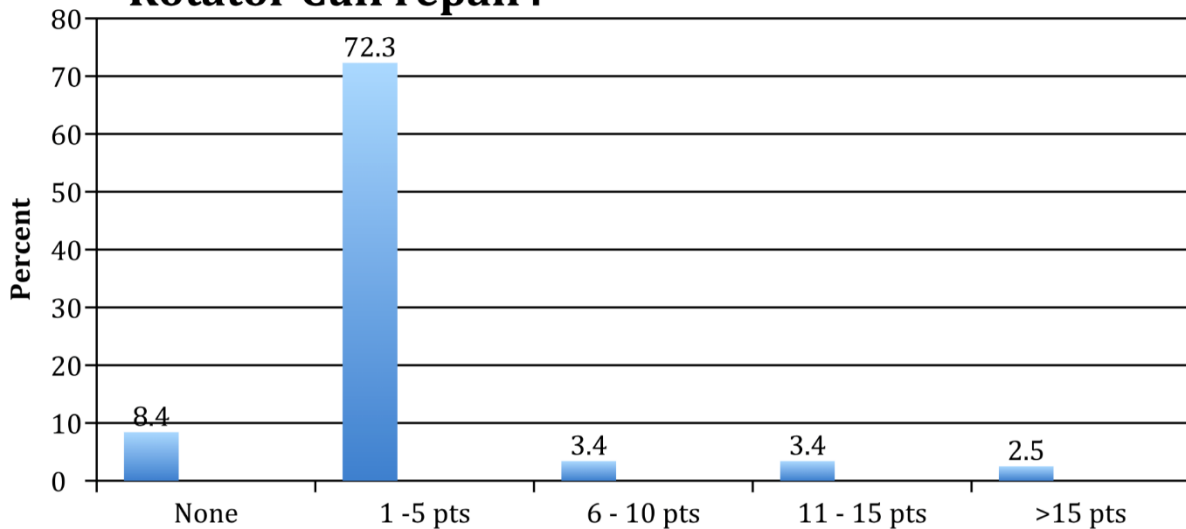
### Q3: What is your gender?



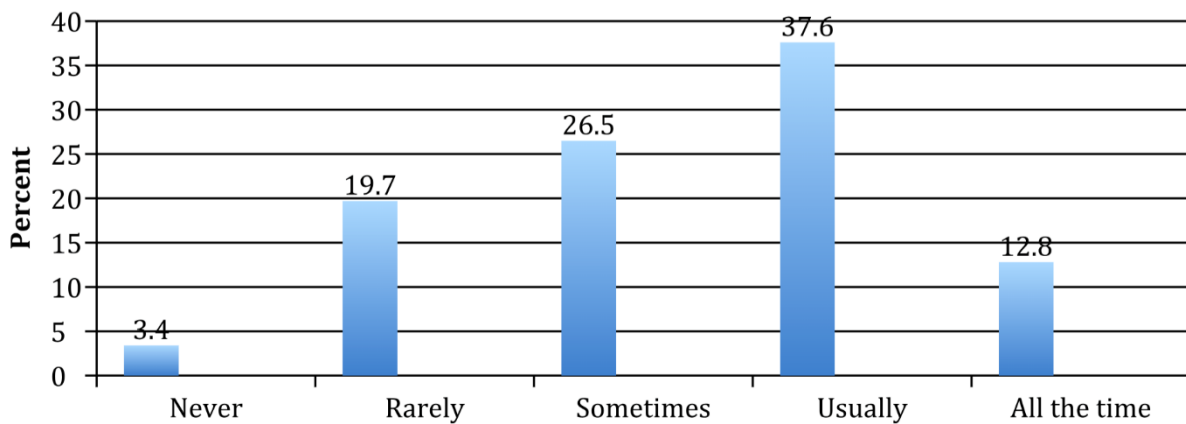
### Q4: What is the highest level of degree obtained?



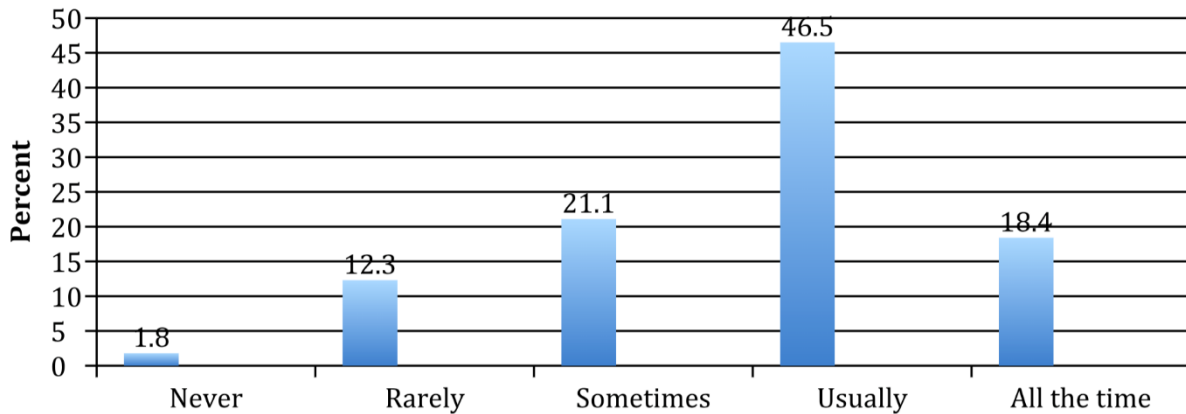
**Q5: In a typical month, how many patients would you see that have had a Bankart &/or Rotator Cuff repair?**



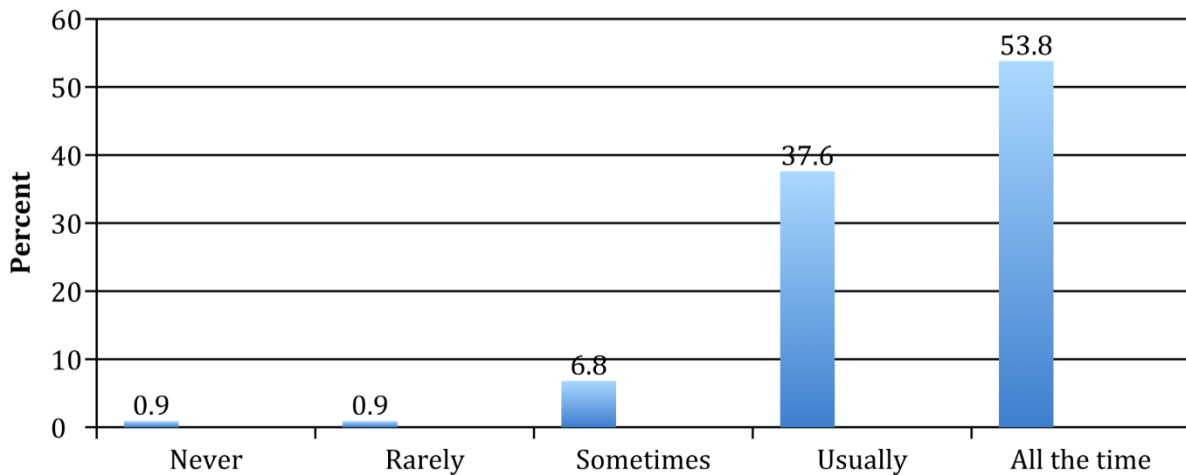
**Q6: When treating a patient who has had a Bankart &/or Rotator Cuff repair, how frequently would you receive instructions from the surgeon about the post-operative management of the patient?**



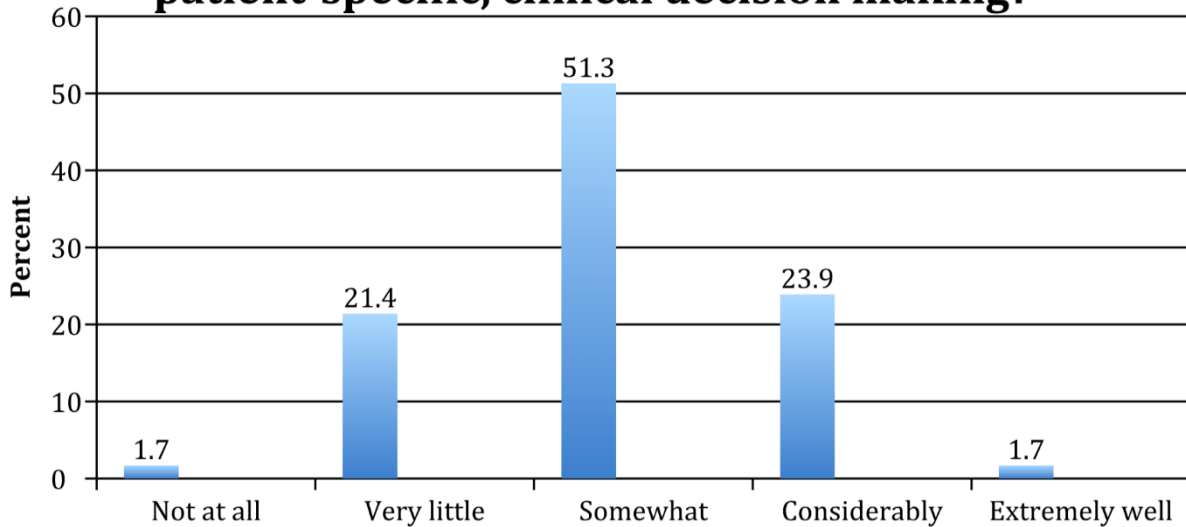
**Q7: When treating a patient who has had a Bankart &/or Rotator Cuff repair, how frequently would the instructions from the surgeon be in the form of a post-op protocol?**



**Q8: When treating a patient who has had a Bankart &/or Rotator Cuff repair, how often do you follow/use the protocol that you have been given?**

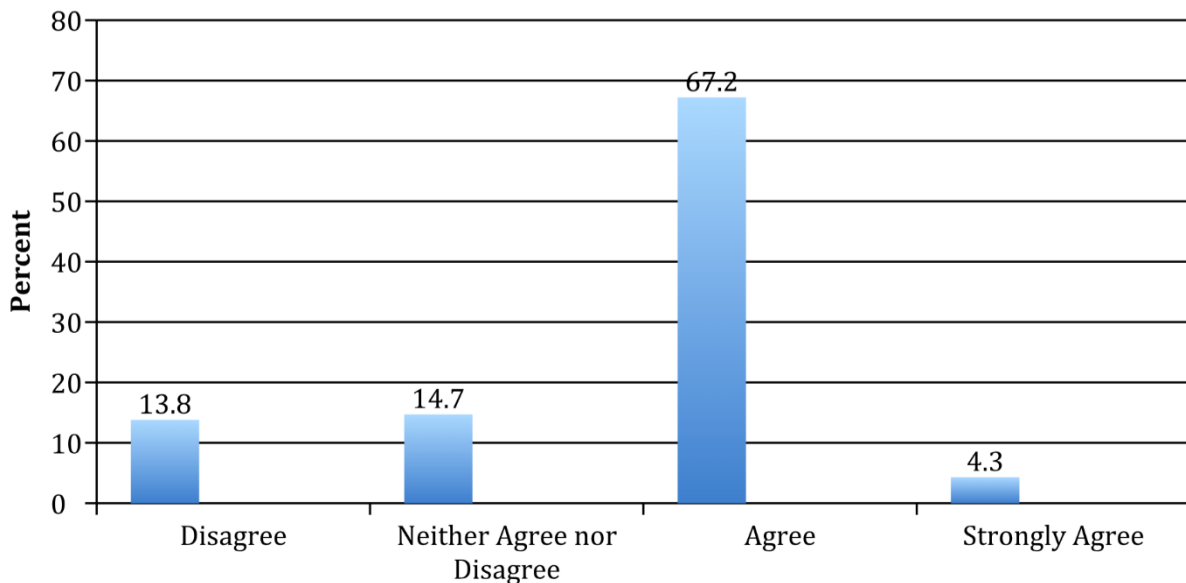


**Q9: How well do you think post-op Bankart &/or Rotator Cuff repair protocols promote patient-specific, clinical decision making?**

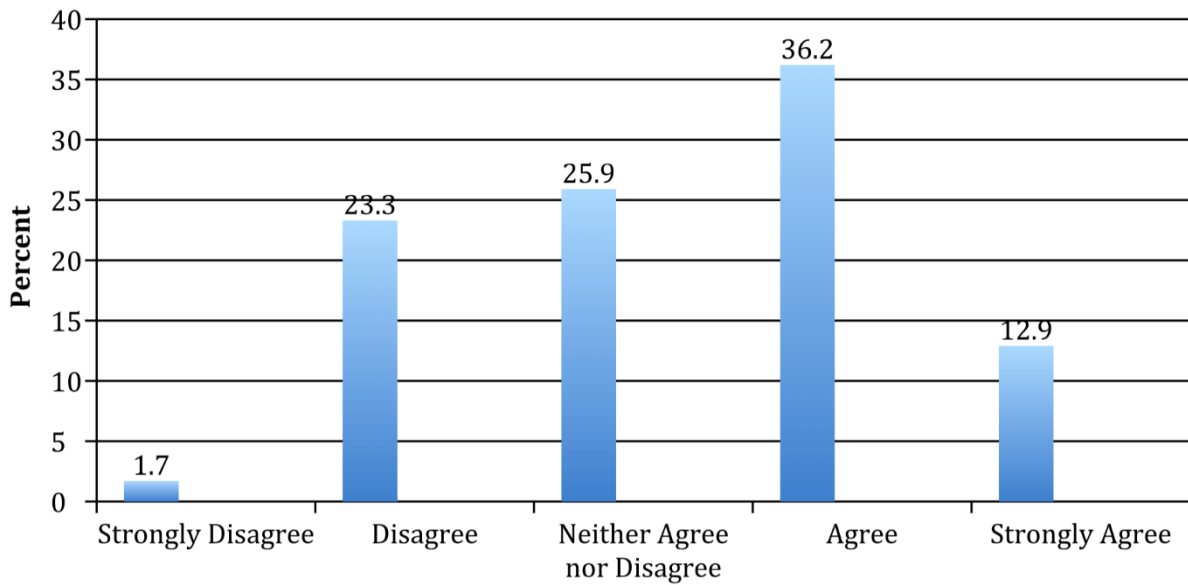


**Q10: Rate the level of agreement with the following statements regarding post-op Bankart &/or Rotator Cuff repair protocols.**

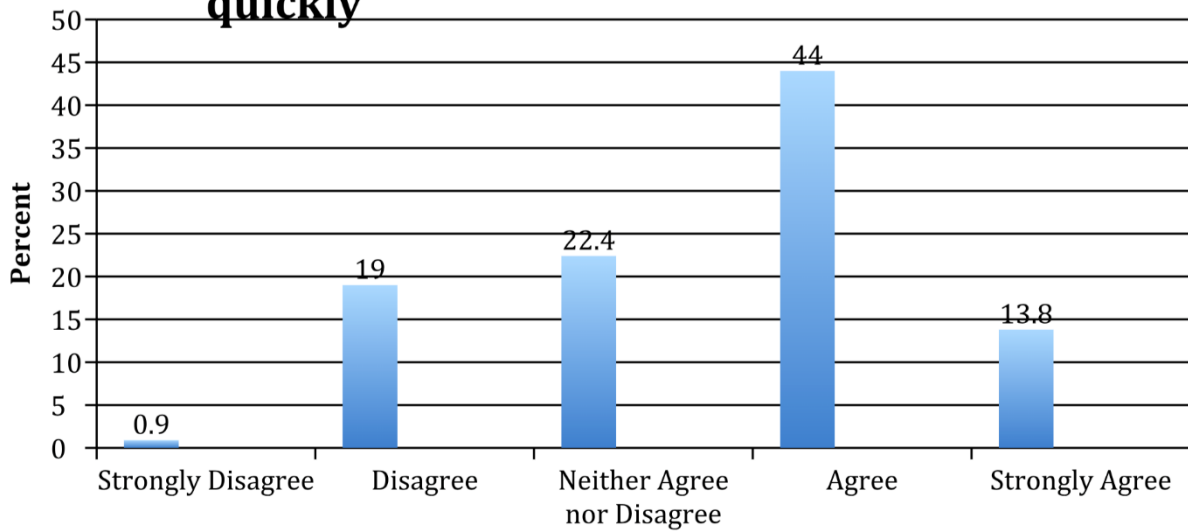
**Q10a: My patients do not always present the way the protocol suggests they should**



**Q10b: I always follow the protocol because I do not want to contradict the surgeon**

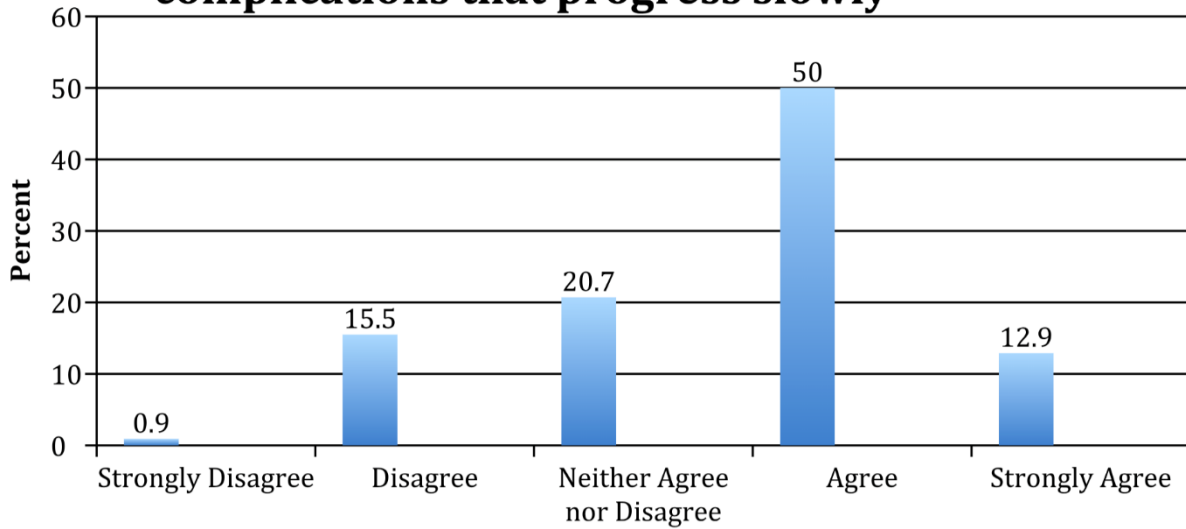


**Q10c: Protocols are limiting; they do not apply to all patients, especially those that progress quickly**

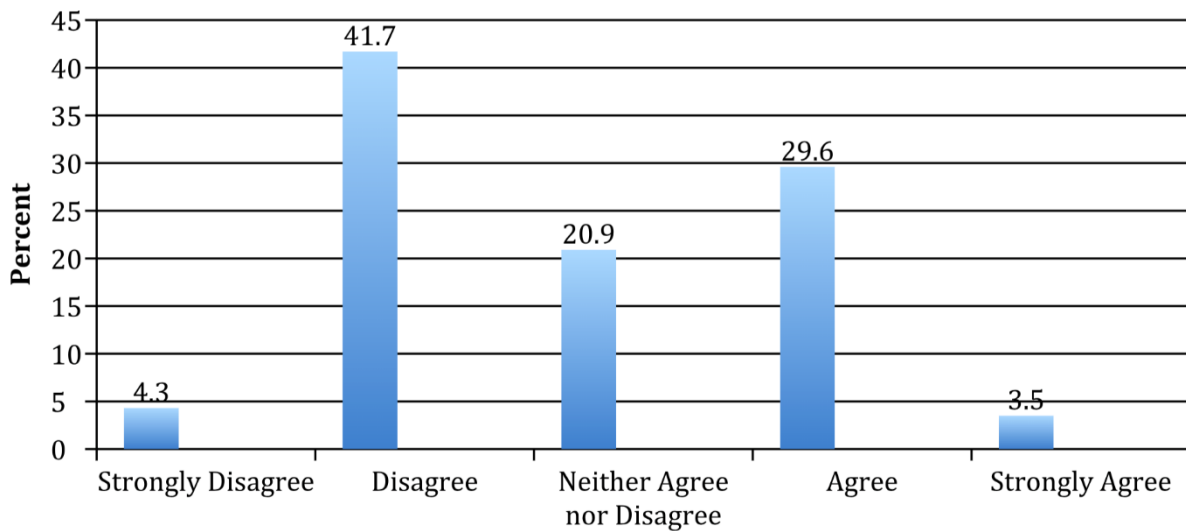




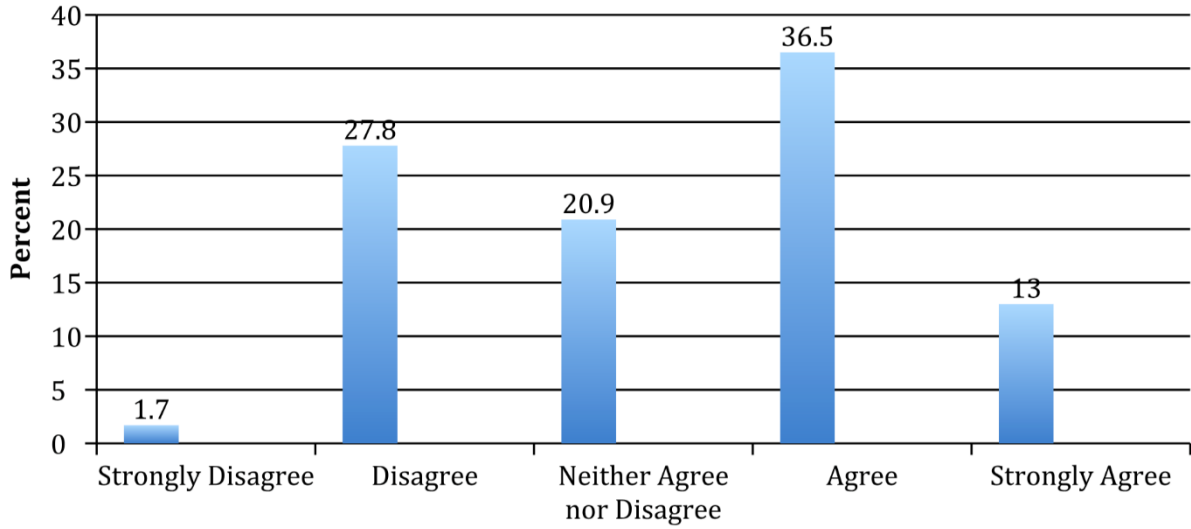
**Q10d: Protocols are limiting; they do not apply to all patients, especially those with complications that progress slowly**



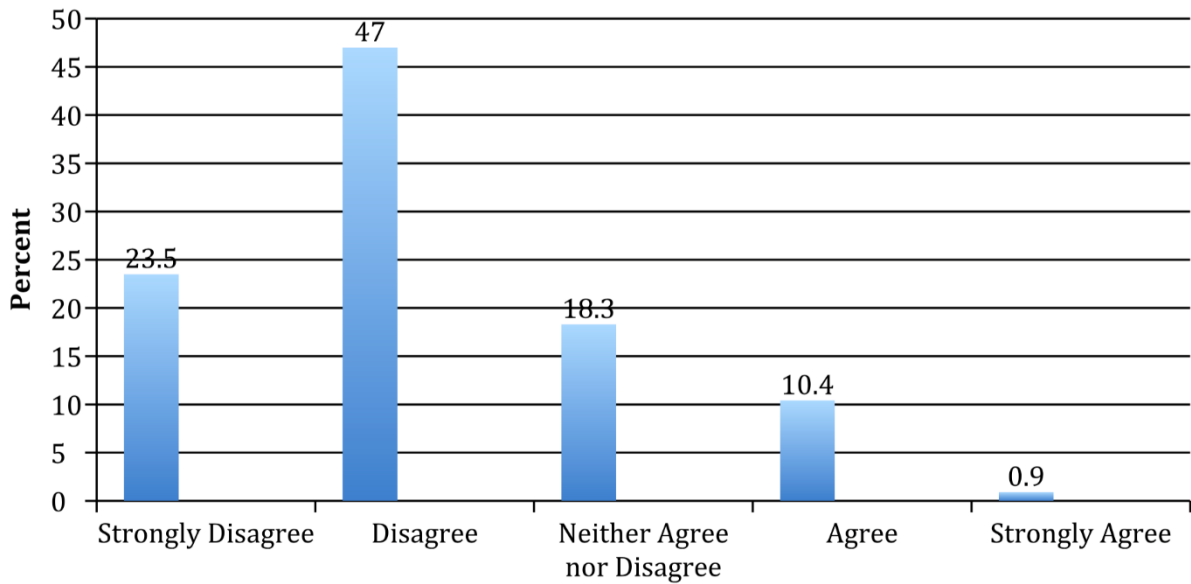
**Q10e: The information about specific treatments provided on post-op shoulder protocols is sufficient**

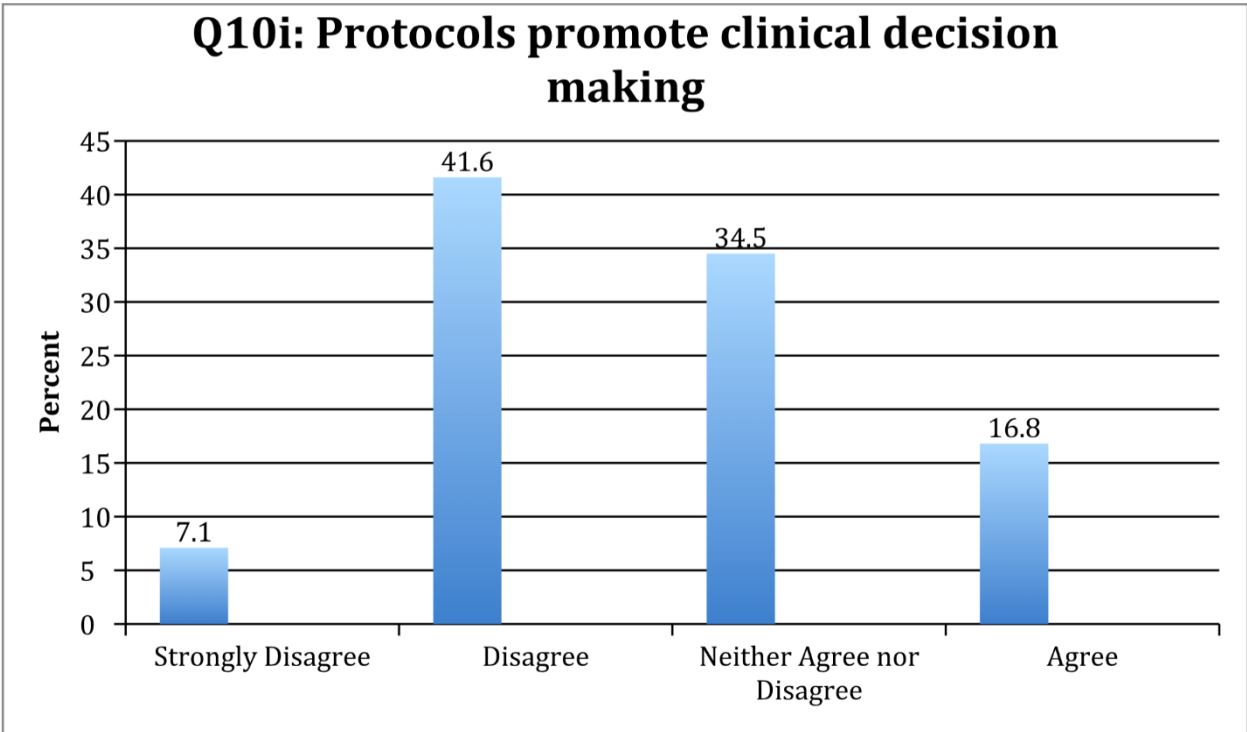
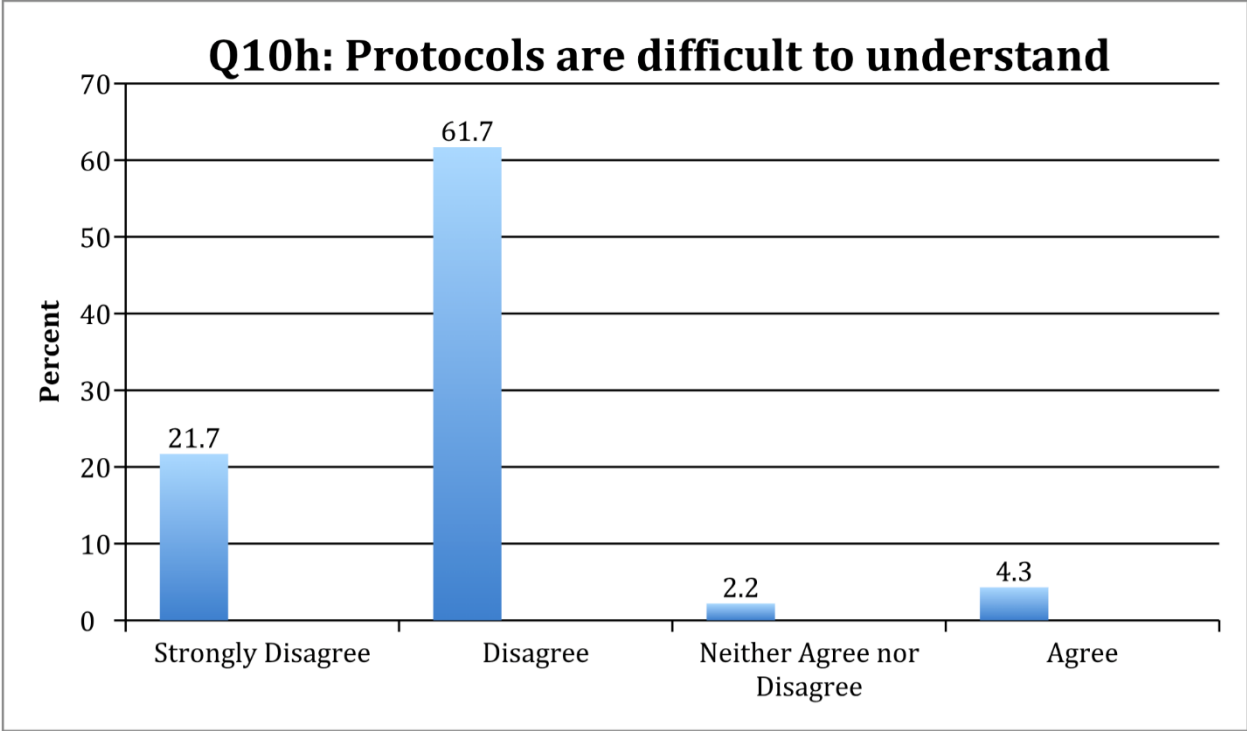


**Q10f: Protocols differ from surgeon to surgeon and it is hard to know which one is best to follow**

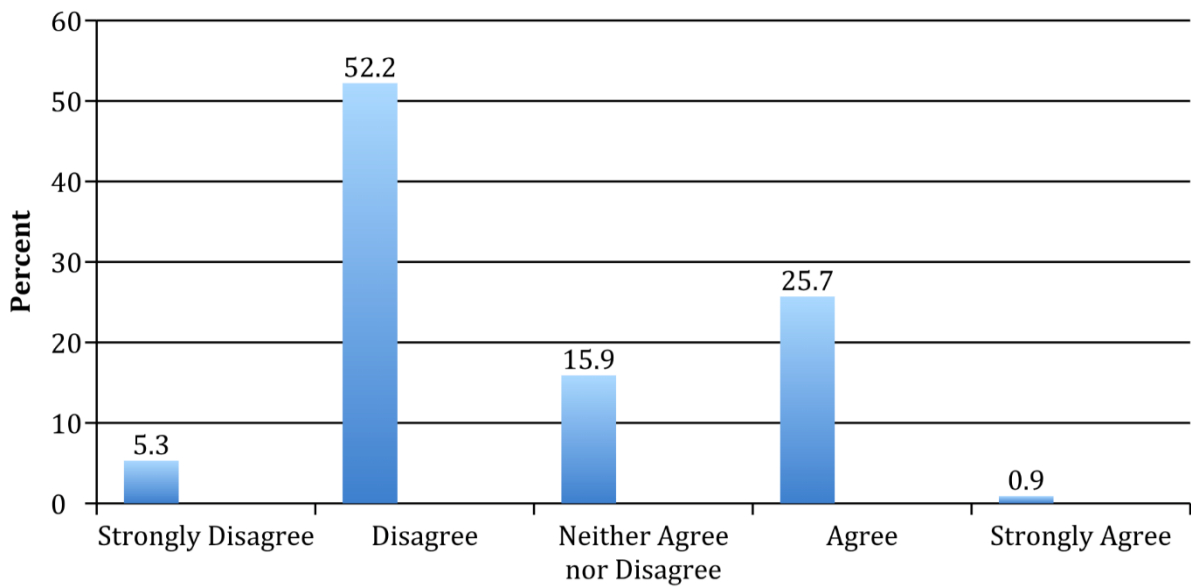


**Q10g: Sufficient information is included about the shoulder surgical procedure performed**





**Q10j: Protocols provide enough information on contraindications and precautions**



**Q10k: I use shoulder protocols as a guide only and adjust them as needed according to my patient**

