Statistical Analysis Plan

Prospective Multi-Center Post-Market Clinical Follow-up Study to Evaluate Safety and Performance of the MICRORAPTOR™ REGENESORB™ Suture Anchor, MICRORAPTOR™ Knotless REGENESORB™ Suture Anchor and MICRORAPTOR™ Knotless PEEK Suture Anchors (and MINITAPE Sutures) in Shoulder and Hip Arthroscopic Instability Repair

STATISTICAL ANALYSIS PLAN (SAP)

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Contents

1 LIST OF ABBREVIATIONS

Abbreviation	Definition
ADE	Adverse Device Effect(s)
ADL	Activities of Daily Living
AE	Adverse Event(s)
ANOVA	Analysis of Variance
CI	Confidence Interval
CRF	Case Report Form(s)
DevD	Device Deficiency(ies)
FAS	Full Analysis Set
HHS	Harris Hip Score
HOS-ADL	Hip Outcome Score – Activities of Daily Living
IQR	Interquartile Range

Abbreviation	Definition
LOCF	Last Observation Carried Forward
NA or N/A	Not Applicable
MRI	Magnetic Resonance Imaging
N (or n)	Total Sample Size (or subgroup sample size)
PEEK	Polyether ether ketone
PP	Per-protocol Population
PRO(M)	Patient Reported Outcome (Measure)
QoL	Quality of Life
RG	Regenesorb
ROM	Range of Motion
S+N	Smith & Nephew Inc.
SADE	Serious Adverse Device Effect(s)
SAE	Serious Adverse Event(s)
SAF	Safety Analysis Set
SAP	Statistical Analysis Plan
SD	Standard Deviation
TFL	Tables, Figures and Listing
USADE	Unanticipated Serious Adverse Device Effect(s)
VAS	Visual Analog Scale
WOSI	Western Ontario Shoulder Instability Index

2 INTRODUCTION

This statistical analysis plan (SAP) is written to specify in greater detail, the statistical analyses that will be carried out as outlined in MICRORAPTOR study: protocol ID 2018.20.SMD.MRPTKT.PRO version 3.0 dated 03-Sep-2021. The contents of this SAP and its accompanying tables, figures and listings (TFLs) mockups will serve as guideline for programming the TFLs that will summarize the study data.

If modifications to the analyses specified herein or additional analyses required prior to reporting, these would be detailed either in an addendum to the SAP or in an amended SAP.

3 STUDY DESIGN

This is a prospective, multi-center, PMCF study to evaluate the safety and performance of MICRORAPTOR™ Suture Anchors in a total of 315 subjects needing reattachment of soft tissue to bone as follows:

MICRORAPTOR™ REGENESORB™ suture anchors implanted in 135 subjects (75 shoulder subjects and 60 hip subjects)
MICRORAPTOR™ Knotless REGENESORB™ suture anchors implanted in 120 subjects (60 shoulder subjects and 60 hip subjects)
MICRORAPTOR™ Knotless PEEK Suture Anchors implanted in 60 subjects (30 shoulder subjects and 30 hip subjects)

For one of the following indications:

Shoulder - Capsular stabilization for Bankart repair, anterior shoulder instability, superior labrum from anterior to posterior (SLAP) lesion repairs, capsular shift or capsulolabral reconstructions; biceps tenodesis (knotless anchors only)
Hip - Acetabular labrum repair/reconstruction

Table 1: Schema

Visit Type/name	Frequency / Time point
Visit 1/Pre-Operative	(≤ 30 days) Within 30 days of Visit 2

Visit 2/Operative through Discharge	Day 0 - Surgery
Visit 3/Follow-up	6 months (± 1 month) post-surgery
Visit 4/Follow-up (MICRORAPTOR™ Knotless REGENESORB™ subjects)/End of Study (MICRORAPTOR™ REGENESORB™, MICRORAPTOR™ Knotless PEEK subjects)	12 months (± 1 month) post-surgery
Visit 5/End of Study* (MICRORAPTOR™ Knotless REGENESORB™ subjects)	24 months (± 1 month) post-surgery

Table 2: Study Schedule of Events

Schedule of Events	**Visit 1 Pre-operative (≤ 30 Days)**	**Visit 2 Operative through Discharge Day 0**	**Visit 3 Follow-up 6 Months (± 1 Month)**	**Visit 4 Follow-up (MICRORAPTOR™ Knotless REGENESORB™ subjects) End of Study (MICRORAPTOR™ REGENESORB™/ Knotless PEEK) 12 Months (± 1 Month)**	**Visit 5[1] End of Study[1] (Knotless REGENESORB™) 24 Months (± 1 Month)**	**Unscheduled Visit**
Informed Consent	X					
Inclusion/Exclusion	X					
Demographics	X					
Medical History	X					
Intra-op Failure (visual and surgeon assessment)		X				
Post-op Repair Failure			X	X	X	X
Assessments **All Subjects**: Pain assessment with VAS	X		X	X	X	X

Shoulder: ROWE Score WOSI Score Constant-Murley Shoulder Scale or **Hip:** HOS-ADL Score Mod. Harris Hip Score						
X-ray / Imaging	X		X[2]	X[2]		X
MRI[3]	X[3]		X[3]		X[3]	
Adverse Event Assessment		X	X	X	X	X
Concomitant medications/therapies		X	X	X	X	X
End of Study/Exit			X[4]	X	X	X[4]

Abbreviations: VAS, Visual Analog Scale; WOSI, Western Ontario Shoulder Instability Index; HOS-ADL, Hip Outcome Score-Activities of Daily Living

1. For MICRORAPTOR™ Knotless REGENESORB™ arms: only 30 hip and 30 shoulder subjects will be required to complete 24-month visit
2. If needed to investigate repair failure.
3. Required only for MICRORAPTOR™ Knotless REGENESORB™ Arms
4. If necessary

4 STUDY OBJECTIVES

4.1 Primary Objective(s)

To assess, by product, repair failure rate at 6 months post operation with the MICRORAPTOR™ REGENESORB™ device, MICRORAPTOR™ Knotless REGENESORB™ Suture Anchor or MICRORAPTOR™ Knotless PEEK Suture Anchors.

4.2 Secondary Objective(s)

The secondary objective is to assess intra-operative repair failure and post-operative repair failure rates as well as performance assessed with patient-reported outcomes by anchor product.

5 STUDY ENDPOINTS

5.1 Primary Endpoint(s)

The primary effectiveness endpoint is repair failure rate, (π) in the study device at 6 months post-operative by anchor product. Repair failure is to be determined by physician diagnostic of recurrent shoulder dislocation, subluxation, and patient symptoms (such as pain). In the event of suspected repair failure, magnetic resonance imaging (MRI) or CT scan will be conducted to confirm the root cause of the failure (i.e. intraarticular labrum failure or fixation repair failure) and the presence of glenoid bone loss. The focus of this study is fixation failure, so it is important to understand if the repair failure is device-related or not.

5.2 Secondary Endpoint(s)

The secondary endpoints are as listed below: (All endpoints to be collected and analysed by product)

All subjects:

- Repair failure rate at 12 months, as assessed by the surgeon.
- Change in VAS pain assessment from the pre-operative visit to each post-operative visit.

MICRORAPTOR™ REGENESORB™ and MICRORAPTOR™ Knotless PEEK subjects:

- Radiographic evaluation at 6 and 12 months (if needed to investigate root cause of failure).

MICRORAPTOR™ Knotless REGENESORB™ subjects:

- Repair failure rate at 24 months.
  - Radiographic evaluation at 12 months (if needed to investigate root cause of failure).
  - MRI to determine anchor absorption/replacement by bone at 6 months and 24 months.

Shoulder subjects:

- Change in ROWE and WOSI shoulder scores from the pre-operative visit to each post-operative visit.
- Change in Constant-Murley Shoulder scale from the pre-operative visit to each post-operative visit.

Hip subjects:

- Change in Hip Outcome Score Activities of Daily Living (HOS-ADL) from the pre-operative visit to each post-operative visit.

- Change in Modified Harris Hip Score from the pre-operative visit to each post-operative visit.

5.3 Safety Endpoint(s)

The safety endpoints include the collection of the following events:

- All adverse events (AEs), serious adverse events (SAEs), device deficiencies (DDs), adverse device effects (ADEs), and serious adverse device effects (SADEs), and unanticipated serious adverse device effects (USADEs) occurring from the time of enrollment until study termination or study completion including intra-operative adverse events and complications.
- Device related intervention.

6 STATISTICAL CONSIDERATIONS

6.1 Determination of Sample Size

The sample size for this study is precision-based, and not based on statistical power considerations, thus no formal statistical hypothesis is formulated. The sample size for this study is determined based on the feasibility of recruitment, enrolment and follow-up considerations.

The primary endpoint for the study upon which sample size is determined as repair failure rate in the study device at 6 months. This will be analysed per product. In the publication based on the systematic review entitled: "Is arthroscopic surgery for stabilization of chronic shoulder instability as effective as open surgery?" authored by Hobby et al. 27 the combined failure rate (from meta-analysis), in the suture anchors is 8.9% (i.e. a clinical success of 91.1%).

For the Microraptor Regenesorb arms (MICRORAPTOR™ REGENESORB™ Suture Anchor and MICRORAPTOR™ Knotless REGENESORB™ Suture Anchor), the sample size is estimated based on assumption of attainment of a clinical success rate of 91.1% with a 95% confidence interval (CI) of 81.1% to 100% (i.e. at a precision of ± 10%). Using these assumptions, enrolling up to 60 subjects for evaluation of each shoulder and hip suture anchor would yield a probability of 96% (evaluation of combined shoulder and hip anchors using the same assumption would yield > 99% probability). Therefore, enrolment of 120 patients for the MICRORAPTOR™ REGENESORB™ Suture Anchor and enrolment of 120 patients for the MICRORAPTOR™ Knotless REGENESORB™ Suture Anchor is deemed sufficient to meet the primary objective for this study.

For the MICRORAPTOR™ Knotless PEEK arm, the same assumptions as above are used, but with precision of ±15% as this is an inert, non-resorbable Class IIb device and will be estimated based on assumption of attainment of a clinical success rate of 91.1% with a 95% confidence interval (CI) of 76.1% to 100% (i.e. at a precision of ± 15%). Using these assumptions, enrolling up to 30 subjects for evaluation of each shoulder and hip suture anchor would yield a probability of 95% (evaluation of combined shoulder and hip anchors using the same assumption would yield > 99% probability). Therefore enrolment of 60 patients for the MICRORAPTOR™ Knotless PEEK Suture Anchor is deemed sufficient to meet the primary objective of this study.

Unfortunately, the MICRORAPTOR™ REGENESORB™ (Knotted) Suture Anchor IFU has been updated part way through the enrolment phase of this clinical study and now excludes biceps tenodesis. As a result, protocol modifications have been made to ensure the eligibility criteria aligns with the new indications for use. With this in mind and accounting for the 17 shoulder patients with biceps tenodesis enrolled in the study under protocol V2.0 (as at 15SEP2021), it is recommended to increase the total patient recruitment target to N=315 patients to ensure the study captures sufficient data on the indications per the current IFU.

Device	Hip	Shoulder
MICRORAPTOR™ REGENESORB™	60	75
MICRORAPTOR™ Knotless REGENESORB™	60	60
MICRORAPTOR™ Knotless PEEK	30 (at least 8 with MINITAPE)	30 (at least 8 with MINITAPE)
Total	**150**	**165**

6.2 Randomisation

No randomisation is planned for this study. Selection of the surgical approach will be at the discretion of the Investigator, in consultation with the subject, as appropriate. To ensure the correct number of subjects are enrolled into each arm, the Sponsor will continuously monitor enrollment and will close enrollment into the faster enrolling arm once the targeted enrollment has been reached. Enrollment into the slower enrolling arms will continue until the study is fully enrolled.

6.3 Interim Analysis

No interim analyses are planned for this study.

7 STATISTICAL ANALYSIS

7.1 General

All statistical comparisons of the data will indicate the test statistic used as well as its distributional assumptions. Unless otherwise stated, all statistical significance tests will be two-sided, performed at the 5% significance level (i.e. $\alpha = 0.05$). Where appropriate, the resulting p-values will be quoted and if applicable, the corresponding 95% two-sided confidence intervals (CIs) will also be generated. All p-values will be rounded to three decimal places, p-values less than 0.001 will be presented as '<0.001' in all tables.

For data summaries, categorical and ordinal variables will be summarized with frequencies and percentages. Continuous variables will be summarized with the following summary statistics: number of observations, mean, median, standard deviation, minimum and maximum values, interquartile range (IQR), Q1 and Q3.

There are three products in this study: Regenesorb (RG) knotless, RG knotted, and PEEK. All tables should be presented by these products in separate columns where applicable.

7.2 Analysis Populations

The following section details the analysis populations:

Safety (SAF) Population: This includes all subjects who have received the study device.

Full Analysis Set (FAS): This includes all patients who were recruited into the study and have at least one post-baseline visit.

Per-Protocol (PP) Population: This includes all subjects in the Full Analysis Set, who have no significant protocol deviations and who meet all the inclusion/exclusion criteria.

All baseline disposition and demographic tables will be produced for all three analysis populations. The failure rate, radiographic assessment, safety and protocol deviation tables will be given for

the SAF population. Tables for Patient-Reported Outcome Measures (PROMs) will be provided for both the FAS and PP populations.

7.3 Handling of Missing, Incomplete and Repeat Data

Only observed data will be reported, as this study does not consider any inferential statistical analysis.

7.4 Derived Data

Analysis populations

- Flag for inclusion in the SAF population
- Flag for inclusion in the FAS population
- Flag for inclusion in the PP population

Treatment groups

- Flag for Microraptor REGENESORB suture anchor
- Flag for Microraptor Knotless REGENESORB suture anchor
- Flag for Microraptor Knotless PEEK suture anchor
- Flag for those that received a MINITAPE suture

Change from pre to postoperative visits

This will be calculated as:

$$\text{Post–operative value}_{visit\ n} - \text{Pre–operative value}(_{Visit\ 1}) \ where\ n > 1.$$

Body Mass Index (BMI)

- BMI = {(Weight in kg)/(Height in m)^2}, if units are in kg for weight and m for height
- BMI = {(Weight in lbs.)x703.07))/(Height in inches)}, if units are in lbs. for weight and inches for height (Adjustments made to formula to standardize BMI unit to kg/m^2)

Modified Harris Hip Score (HHS)

The mHHS[5] is a joint specific score that consists of 8 items covering domains of pain (1 item, 0-44 points) and function (7 items, 0-47 points). This is the modified HHS so absence of deformity and range of motion are not evaluated. The overall modified HHS ranges from 0 (worst) to 91 (best).

Algorithms used for scoring each of the 8 items (components) of the HHS as well as its domains (pain and function) as well as total HHS are summarized in Table 4. If subjects have missing responses for items then an overall score will not be calculated.

Table 4. Modified Harris Hip Score (HHS) scores per item and domain

Item	Original Response	Likely scores per Item	Domains (Range of Scores)
Pain	None	44	Pain Domain (0 to 44)
	Slight	40	
	Mild pain	30	
	Moderate	20	
	Marked	10	
	Disabled	0	
Limp	None	11	Function Domain (0 to 47) {Sum of all items within subdomain}
	Slight	8	
	Moderate	5	
	Severe	0	
Support	None	11	
	Single cane for long walks	7	
	Single cane most of the time	5	
	One crutch	3	
	Two canes	2	
	Two crutches or not able to walk	0	
	Unlimited	11	

Distance Walked	Six blocks	8	
	Two or three blocks	5	
	Indoors only	2	
	Bed and chair only	0	
Sitting	Comfortable in ordinary chair for one hour	5	
	Comfortable in a high chair for one-half hour	3	
	Unable to sit comfortably in any chair	0	
Public transportation	Yes	1	
	No	0	
Stairs	Foot over foot without use of banister	4	
	Foot over foot using banister	2	
	In any manner	1	
	Unable to do stairs	0	
Socks/Shoes	Puts on socks and ties shoe with ease	4	
	Puts on socks and ties shoe with difficulty	2	
	Unable to put on socks or tie shoe	0	
Total HHS		Sum of all domain scores per subject	
Note: The maximum possible score for the HHS is 91.			

ROWE

The ROWE[1] is a shoulder specific score that consists of 3 items covering domains of stability (1 item, 0-50 points), range of motion (1 items, 0-20 points), and function (1 item, 0-30 points). The overall ROWE ranges from 0 (worst) to 100 (best). Algorithms used for scoring each of the 3 items (components) of the ROWE as well as its domains (stability, range of motion and function) as well as total ROWE score are summarized in Table 5. If subjects have missing responses for items then an overall score will not be calculated.

Table 5. ROWE score per item and domain

Item	Original Response	Likely scores per Item	Domains (Range of Scores)
Stability	No Recurrence, subluxation or apprehension	50	Pain Domain (0 to 50)
	Apprehension when placing arm in certain positions	30	
	Subluxation (not requiring reduction)	10	
	Recurrent Dislocation	0	
Range of motion	100% of normal ext. 2 rotation, int. rotation and elevation	20	Range of motion domain (0 to 20)
	75% of normal ext. rotation, int. rotation and elevation	15	
	50% of normal ext. rotation, int. rotation and elevation	5	
	50% of normal elevation and int. rotation, no ext rotation	0	
Function	No limitation of work or 3 sports, little or no discomfort (eg shoulder strong overhead, lifting, swimming, throwing, tennis)	30	Function domain (0 to 30)
	Mild limitation and minimum discomfort	25	
	Moderate limitation and discomfort	10	
	Marked limitation and pain	0	

Total ROWE		Sum of all domain scores per subject	
Note: The maximum possible score for the ROWE Score is 100.			

WOSI

The Western Ontario Shoulder Instability Index[2] (WOSI) is a shoulder specific index designed to assess the quality of life in individuals with shoulder instability. It consists of 21 items covering domains of physical symptoms (10 items), Sports, Recreation, and Work (4 items), Lifestyle (4 items), and emotions (3 items). Each item ranges from 0 (worst) to 100 (best). Overall score range from 0 to 2100 with a score of 0 indicating better shoulder function and 2100 indicating worse shoulder function. If subjects have missing responses for items then an overall score will not be calculated.

The total WOSI score are summarized in Table 5.

Table 5. Western Ontario Shoulder Instability Index (WOSI) score per item and domain

Items	**Original response**	**Likely scores per Item**	**Domains (Range of Scores)**
How much pain do you experience in your shoulder with overhead activities?	0 - "No pain", 100 - "Extreme pain"	0-100	Physical Symptoms (0-1000)
How much aching or throbbing do you experience in your shoulder?	0 - "No aching/throbbing", 100 - "Extreme aching/throbbing")	0-100	
How much weakness or lack of strength do you experience in your shoulder?	0 - "No weakness " 100 - "Extreme weakness"	0-100	

How much fatigue or lack of stamina do you experience in your shoulder?	0 - "No fatigue" 100 - "Extreme fatigue"	0-100	
How much clicking, cracking or snapping do you experience in your shoulder?	0 - "No clicking" 100 - "Extreme clicking"	0-100	
How much stiffness do you experience in your shoulder?	0 - "No stiffness" 100 - "Extreme stiffness"	0-100	
How much discomfort do you experience in your neck muscles as a result of your shoulder?	0 - "No discomfort" 100 - "Extreme discomfort")	0-100	
How much feeling of instability or looseness do you experience in your shoulder?	0 - "No instability" 100 - "Extreme instability"	0-100	
How much do you compensate for your shoulder with other muscles?	0 - "Not at all" 100 - "Extreme	0-100	
How much loss of range of motion do you have in your shoulder?	0 - "No loss" 100 - "Extreme loss	0-100	
How much has your shoulder limited the amount you can participate in sports or recreational activities?	0 - "No limited" 100 - "Extreme limited"	0-100	Sports/Recreation/Work (0-400)
How much has your shoulder affected your ability to perform the specific skills required for your sport or work?	0 - "Not affected" 100 - "Extremely affected"	0-100	
How much do you feel the need to protect your arm during activities?	0 - "Not at all" 100 - "Extreme"	0-100	
How much difficulty do you experience lifting heavy objects below shoulder level?	0 - "No difficulty" 100 - "Extreme difficulty"	0-100	
How much fear do you have of falling on your shoulder?	0 - "No fear" 100 - "Extreme fear"	0-100	Lifestyle (0-400)
How much difficulty do you experience maintaining your desired level of fitness?	0 - "No difficulty" 100 - "Extreme difficulty"	0-100	

How much difficulty do you have "roughhousing or horsing around" with family or friends?	0 - "No difficulty" 100 - "Extreme difficulty"	0-100	
How much difficulty do you have sleeping because of your shoulder?	0 - "No difficulty" 100 - "Extreme difficulty"	0-100	
How conscious are you of your shoulder?	0 - "No conscious", 100 - "Extremely conscious"	0-100	Emotions (0-300)
How concerned are you about your shoulder becoming worse?	0 - "No concerned" 100 - "Extremely concerned"	0-100	
How much frustration do you feel because of your shoulder?	0 - "No frustration" 100 - "Extremely frustrated"	0-100	
Total WOSI		Sum of all domain scores per subject	
Note: The maximum possible score for the WOSI Score is 2100.			

HOS-ADL

The Hip Outcome Score – Activities of Daily Living (HOS-ADL)[3] is a hip-specific assessment scale designed to evaluate the effectiveness of treatments for individuals with acetabular tears. The HOS-ADL consists of 17 items, each addressing a specific activity of daily living related to hip function. The 17 activities (items) evaluated in the HOS-ADL are:

1. Standing for 15 minutes
2. Getting into and out of an average car
3. Walking up steep hills
4. Walking down steep hills
5. Going up 1 flight of stairs
6. Going down 1 flight of stairs
7. Stepping up and down curbs
8. Deep squatting

9. Getting into and out of the bathtub
10. Walking initially
11. Walking for approximately 10 minutes
12. Walking 15 minutes or greater
13. Twisting/pivoting on the involved leg
14. Rolling over in bed
15. Light to moderate work (standing, walking)
16. Heavy work (pushing/pulling, climbing, carrying)
17. Recreational activities

It's important to note that question 18 (Putting on socks and shoes), and question 19 (Sitting for 15 minutes), should not be included in the analysis.

Each item is scored on a 5-point Likert scale, as follows:

- 4 points: No Difficulty at All
- 3 points: Slight Difficulty
- 2 points: Moderate Difficulty
- 1 point: Extreme Difficulty
- 0 points: Unable to Do

The score is calculated by summing the scores for all completed items (the Obtained Score) and dividing this sum by the total possible score (the Maximum Score). The result is then multiplied by 100 to express the score as a percentage:

$$HOS\text{-}ADL\ score^{3} = (Obtained\ Score\ /Maximum\ Score)*100$$

The Maximum Score is determined by multiplying the number of completed items by 4 (the highest possible score for each item).

The final score ranges from 0% (indicating the least function) to 100% (indicating the most function). If subjects have missing responses for items then an overall score will not be calculated.

Constant-Murley Shoulder

The Constant-Murley score is derived using the following:

Constant-Murley score[4] = [VAS pain score (0-15) + Cumulative ADL score (0-20) + Cumulative mobility score (0-40) + Maximum strength score (0-25)]

Table 6. Constant-Murley Shoulder score per item and domain

Item	Original Response	Likely scores per Item	Domains (Range of Scores)
Pain level during ordinary activities	No pain – Intolerable Pain	0-15	VAS Pain score (0-15)
Is your sleep disturbed by your shoulder?	Undisturbed sleep	2	*Cumulative ADL score (0-20)*
	Occasional disturbance	1	
	Every night	0	
How much of your normal daily work does your shoulder allow you to perform?	0-3	4	
	4-6	3	
	7-9	2	
	10-12	1	
	13-15	0	
How much of your normal recreational activity does your shoulder allow you to perform?	0-3	4	
	4-6	3	
	7-9	2	
	10-12	1	
	13-15	0	
To which level can you use your hand comfortably?	Below the waist	0	
	Up to waist	2	
	Up to xiphoid/sternum	4	
	Up to neck	6	
	Up to top of head	8	
	Above head	10	

Movement flexion	0-30	0	*Cumulative mobility score (0-40)*
	31-60	2	
	61-90	4	
	91-120	6	
	121-150	8	
	≥151	10	
Movement abduction	0-30	0	
	31-60	2	
	61-90	4	
	91-120	6	
	121-150	8	
	≥151	10	
External rotation – check all that apply	Hand behind head, elbow forward	2	
	Hand behind head, elbow back	2	
	Hand to top of head, elbow forward	2	
	Hand to top of head, elbow back	2	
	Full elevation	2	
Internal rotation	Lateral thigh	0	
	Behind the buttock	2	
	Sacroiliac joint	4	
	Waist	6	
	12th thoracic vertebra	8	
	Interscapular	10	
Strength[1]	Strength (lbs) 1st Attempt	Max (1st attempt, 2nd attempt, 3rd attempt)	*Maximum strength score (0-25)]*
	Strength (lbs) 2nd attempt		
	Strength (lbs) 3rd attempt		

Total Constant-Murley		Sum of all domain scores per subject	
Note: The maximum possible score for the Constant Murley- Score is 100.			

[1] If strength has been measured in kilograms, convert it to pounds by multiplying by 2.2.

- Calculate the CM score for each visit, as well as the change from baseline score to each visit (score at post-op visit minus score at baseline).

If subjects have missing responses for items then an overall score will not be calculated.

Adverse Events

Investigator events do not receive a classification and so S+N classify events as follows:

- An event will be classified as an ADE if the relationship to the study device and/or the relationship to the study procedure is possibly/definitely
- An event will be classified as an SAE if the event is serious
- An event will be classified as an SADE if it is an ADE which is also serious
- An event will be classified as a USADE if it is an SADE which is also unanticipated
- Otherwise, the event will be a non-device, non-procedure related, non-serious AE

For adverse events that have been resolved, duration of adverse event is calculated as end date minus start date.

Due to system updates, checks need to be performed to ensure the most stringent classification is being reported. When comparing Investigator assessments (classifications as above) with AEMB classifications, the most stringent classification should be reported as follows:

Investigator assessment	Sponsor classification	Most stringent
AE	SAE	SAE

SAE	AE	SAE
AE	ADE	ADE
ADE	AE	ADE
ADE	SADE	SADE
SADE	ADE	SADE
SAE	SADE	SADE
SADE	SAE	SADE
SADE	USADE	USADE

7.5 Baseline Data

Preoperative or operative variables will be summarized using descriptive characteristics for continuous or categorical data as applicable.

- Age (in years),
- Sex males or females),
- Ethnicity
- Race
- Body Mass Index (BMI)
- Type of surgery
- Anchor Type
- Side of implantation (left versus right)
- Hip surgery indications
- Shoulder surgery indications
- Instruments used in Hip / Shoulder procedures
- Pregnancy test performed
- Presence of Intra-op Failures

For the MICRORAPTOR™ Knotless PEEK product, summaries will be presented on subjects that received a MINITAPE Suture, specifying the type of suture used (MINITAPE COBRAID White, MINITAPE COBRAID Blue, MINITAPE Blue, Other) by hip/shoulder.

Variables summarized will not only be restricted to the above listed but on all variables deemed pertinent and obtainable preoperatively and operatively. Additionally, age will be categorically summarized by stratifying into: < 60 years versus ≥ 60 years. BMI will also be categorically summarized by stratifying into: < 30 kg/m^2 versus ≥ 30 kg/m^2.

7.6 Disposition Data

- Subject (shoulder and hip) disposition will be summarized after completion of the study using frequency (n) and percentage (%) of subjects (or shoulders/hips) who completed and who did not complete the study. For those who did not complete the study, the primary reason for discontinuation will additionally be summarized.

- A listing of subject (and hip/shoulder) disposition at both interim and at termination visits will be provided. Hip/shoulder accountability information will be tabulated by visit. The information included in this table will include the number of hips/shoulders that are theoretically due, subjects who are dead, hips/shoulders revised, hips/shoulders terminated from the study for any reason. Additional information that will be included on the subject accountability table will include but not limited to the number of hips/shoulders presenting at each visit, number of hips/shoulders expected at each visit.

7.7 Protocol Deviations

A listing of deviations encountered on-study will be listed. Major protocol deviations that are deemed significant which will subsequently lead to the exclusion of subjects in the PP population will be appropriately identified and flagged.

7.8 Measurement of Treatment Compliance

Not applicable.

7.9 Multiplicity

Not applicable.

7.10 Analysis of Primary Endpoint(s)

The repair failure rate will be calculated as the number of subjects with confirmed repair failures divided by the total number of subjects in the study device group at 6 months post-operation. The 95% confidence interval, using the Clopper-Pearson method, will be calculated to assess the precision of this estimate.

The analysis will be performed separately for each anchor product to allow for product-specific evaluation.

- MICRORAPTOR™ REGENESORB™ Suture Anchor
- MICRORAPTOR™ Knotless REGENESORB™ Suture Anchor
- MICRORAPTOR™ Knotless PEEK Suture Anchors (and MINITAPE Sutures)

The focus of the analysis will be on fixation-related failures. Non-device-related failures will be excluded from the analysis.

7.11 Analysis of Secondary Endpoint(s)

The Repair Failure endpoints would be analysed using SAF population.

For PROMs, summaries will be provided using the FAS and PP analysis populations. Changes from preoperative to postoperative will not be analysed for PROMs due to lack of statistical power considered in the study design. Summary statistics for observed PROMs score would be presented.

Repair failure rate

All subjects: The repair failure rate at 12 months will be summarized cumulatively as the number and proportion of patients with confirmed repair failures up to each respective time point by product. Percentages will be calculated based on the number of patients available at each time point, excluding those lost to follow-up for whom the outcome is unknown. A 95% exact confidence interval for the proportion will be presented using the Clopper-Pearson method.

VAS Pain

Summary statistics for VAS pain at each visit will be presented. The change in VAS pain assessment from the pre-operative visit to each post-operative visit will also be presented.

Modified Harris Hip Score (HHS)

- The total HHS and the scores for each of its following subdomains, pain and function, will be summarized using continuous summary characteristics by preoperatively and postoperatively at 6 months, 1 year and 2 years (i.e. by visit).
- Change from baseline to each post-operative visit of the total score will also be presented.

ROWE

- ROWE scores for each subject will further be categorized[6] as follows: Excellent (90-100); Good (75-89); Fair (51-74) and Poor (≤50). Shift tables from the preoperative visit to all postoperative visits using these classifications will be generated.
- The total ROWE and the scores for each of its following subdomains: stability, range of motion, and function will be summarized using continuous summary characteristics by preoperatively and postoperatively at 6 months, 1 year and 2 years (i.e. by visit).
- Change from baseline to each post-operative visit will also be presented.

Western Ontario Shoulder Instability Index (WOSI)

- The overall WOSI and the scores for each of its following subdomains: physical symptoms; sports, recreation, work and pain will be summarized using descriptive statistics for continuous variables by preoperatively and postoperatively at 6 months, 1 year and 2 years (i.e. by visit).
- Change from baseline to each post-operative visit will also be presented.

HOS-ADL

- The transformed (0-100) interval scores will be summarized by visit using descriptive summary characteristics for continuous variables.
- Changes from preoperative to postoperative follow-up time points will similarly be summarized.

Constant-Murley Shoulder

- The CM score consists of 4 domains: pain, activities of daily living (ADL), movement and power/strength. Pain and 3 items under ADL are participant reported while all other items are assessed by an examiner.
- The pain item is a VAS where 0cm indicates no pain and 15cm indicates intolerable pain, and is assigned a maximum of 15 points. The ADL component is assigned a maximum of 20 points with 2 items scored using a VAS and 2 items scored using a Likert scale. The movement section is assigned a maximum of 40 points, and evaluates four active range of motions, receiving 1-10 points each. Finally, the strength component is given a maximum of 25 points and requires the use of a dynamometer. Scoring is calculated from the highest score of 3 attempts – the patients 'best score'.
- Constant-Murley score questionnaires that are incomplete for the questions used for scoring at the baseline visit will not be included in the analyses. The score ranges from 0 to 100 points, with a higher score indicating better shoulder function.
- The overall Constant-Murley Shoulder and its four domains (pain, activities of daily living, mobility and strength) will be summarized using shift tables to compare the preoperative visit with all postoperative visits. Descriptive statistics or continuous variables summaries will be applied as appropriate.
- Change in Constant-Murley Shoulder scale from the pre-operative visit to each postoperative visit will also be presented.

Radiographic Characteristics

The evaluation of anchor absorption/replacement by bone will be summarized using descriptive statistics (continuous or categorical, as appropriate and relevant) by visit. The analysis is structured as follows:

- MICRORAPTOR™ REGENESORB™ and MICRORAPTOR™ Knotless PEEK subjects: MRI evaluations will be conducted at 6 and 12 months.
- MICRORAPTOR™ Knotless REGENESORB™ subjects: Radiographic evaluation at 12 months will be conducted. MRI evaluation will be conducted to determine anchor absorption/replacement by bone at 6 months and 24 months.

The radiographic characteristics will be summarized descriptively (continuous or categorical, as appropriate) for each visit: anchor location, structure visibility at anchor location, anchor condition, anchor osseointegration, anchor subsidence, osteolysis, joint effusion, Bone marrow edema and glenoid Labral Condition.

7.12 Analysis of Exploratory Endpoint(s)

Not applicable.

7.13 Analysis of Safety Endpoint(s)

All safety endpoints will be summarised using the safety population.

Adverse events

All adverse events will be summarized separately by anchor product (MICRORAPTOR™ REGENESORB™, MICRORAPTOR™ Knotless PEEK and MICRORAPTOR™ Knotless REGENESORB™). For the MICRORAPTOR™ Knotless PEEK product, summaries will be split by those that received MINITAPE and those that did not.

Adverse event table summaries will be provided using the most stringent classification from Investigator and Sponsor. Both Investigator and Sponsor classifications will be provided alongside the most stringent classification in the Listings.

The number of events and the number of subjects reporting: adverse events (AE) and serious adverse events (SAE), adverse device effects (ADE), serious adverse device (SADE) and unanticipated serious adverse device effects (USADE) will be summarised.

In addition, AEs will be summarised by Investigator assessment: frequency, severity, anticipated/unanticipated, relationship to device and procedure; treatment and surgical intervention details (type, reason), outcome and duration of adverse events at trial discontinuation will be summarised.

Device deficiencies

The number of device deficiencies and the number of patients reporting a device deficiency will be summarised.

7.14 Other Data Summaries

Not applicable.

7.15 Changes in Analysis Methods Specified in the Protocol

Statistical testing will not be conducted for the endpoints as the study is precision-based rather than based on statistical power considerations. No formal statistical hypothesis has been formulated. Instead, descriptive summary statistics will be presented for the endpoints.

A modification to the analysis population is implemented. The safety population will be used for primary and safety endpoints. FAS and PP populations will be reported for PROs defined in the secondary endpoints.

8 REFERENCES

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4. Constant, C. R., and A. H. Murley. "A clinical method of functional assessment of the shoulder." Clinical orthopaedics and related research 214 (1987): 160-164.
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