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Case Study

Physical Therapy Management of Triangular Fibrocartilage Complex (TFCC) injury: A Case Study

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Abstract

Background: This case study presents the physical therapy management of a 24-year-old male, with a career as a table tennis player, suffering from Triangular Fibrocartilage Complex (TFCC) injury, emphasizing the important role of physical therapy in his recovery process.

The importance of the patient's awareness and early physical therapy management of TFCC wear is highlighted in this case study, showcasing the pivotal role of physical therapy in the recovery process.

Case Presentation: The patient came to the physical therapy clinic, without a referral, complaining from ulnar-sided wrist pain and decreased grip strength. After seeing the patient's MRI scan and clinically correlating it with his signs and symptoms, a diagnosis with TFCC Type 2A and grade 1 sprain of distal radioulnar ligaments on the ulnar side was reached and a rehabilitation program tailored to the patient's needs was put in place.

Management and Outcome: A multi-faceted treatment approach was employed, including manual therapy, therapeutic exercises, sensorimotor training, and neuromuscular re-education. Over the course of eight weeks, significant improvements were observed in pain levels, wrist stability, and range of motion. The patient made a full recovery and was able to return to practicing the sport.

Keywords: TFCC, PEACE & LOVE, Neuromuscular re-education, Sensorimotor Rehabilitation.

Introduction

The Triangular Fibrocartilage Complex (TFCC) is a structure within the wrist that plays a crucial role in stabilizing the joint. It is composed of the articular disc (or triangular fibrocartilage disc), ulnocarpal ligaments, radioulnar ligaments, meniscus homologue, and the sheath of the extensor carpi ulnaris tendon.[1]

It is reported that TFCC lesions represent between 3% and 9% of the hand-wrist injuries in athletes[2], with the Shakehand Grip being the most predisposing to injury[3], this is due to the TFCC being responsible for stabilizing, supporting, and cushioning the wrist, especially during rotation of the hand or when grasping objects. It's an important component for wrist function and can be prone to injury, particularly in athletes, due to overuse, or after trauma like a fall or twist of the wrist. Also, Positive ulnar variance can increase the risk of TFCC injury. This variance refers to a condition in which the distal ulna extends further distally than the distal radius at the wrist joint, resulting in increased axial load transmission through the ulnar side of the wrist, particularly the triangular fibrocartilage complex (TFCC). This anatomical configuration can predispose the TFCC to injury due to repetitive or excessive loading. Ulnar variance is dynamic, decreasing during forearm supination and increasing during pronation[4]. Small changes in ulnar length have been shown to have substantial effects on the amount of load to the ulna, which is why shortening the ulna is sometimes used as a treatment method.[5]

TFCC injuries are typically classified through "Palmar classification" system, which is divided into type 1 (traumatic) and type 2 (degenerative).[6] In both types, literature mentions surgery as the default option for treatment. However, a systematic review on TFCC type 1 injuries mentions that 92% of patients return to their work after surgery, but only 44% were free of pain[7]. In addition, a paper published in the European Journal of Trauma and Emergency Surgery concluded that, in patients without radioulnar instability, conservative treatment scored similar results to arthroscopic debridement, one of the most common surgeries performed to treat TFCC injuries[8]. Another study published by The Korean Orthopaedic Association even stated that patients can regain distal radioulnar stability through conservative treatment.[9]

In this case, the patient is classified as TFCC type 2A (TFCC wear) in addition to

grade 1 sprain of distal radioulnar ligaments on the ulnar side, which is usually managed conservatively without the need for surgery. The patient had already done an MRI scan with a report that declared it "normal", and the patient's treatment consisted of only Non-steroidal Anti-inflammatory Drugs (NSAIDs). However, after further inspection of the MRI and the patient's clinical tests and signs, an injured TFCC was diagnosed, and a physical therapy regimen was commenced.

This case study aims to document the assessment, management, and functional outcomes of a patient with a Type 2A TFCC lesion and a Grade 1 sprain of the distal radioulnar ligaments.

Case Presentation

A 24-year-old male table tennis player visited the physical therapy clinic without a referral. The patient complained of pain on the ulnar side of his wrist and decreased grip strength. The pain increased in radioulnar movements (supination and pronation) as well as ulnar deviation. The patient was a non-smoker and a non-alcoholic, and he didn't suffer from any chronic diseases.

According to the patient, he started to feel pain on his ulnar aspect of this wrist, especially with backhand shots that require ulnar deviation most of the time. This pain started to gradually increase as the days go by, to the point that he had to take a break from training for a couple of days. Upon resuming training after thinking that the pain went away, the patient started to feel the pain re-emerge and decided to seek medical attention.

The patient showed a high level of awareness towards his condition. Initially, he visited an orthopaedic physician complaining of the same symptoms mentioned before and the physician ordered an MRI. The MRI report declared that there doesn't appear to be any signs out of the ordinary. Thus, the physician prescribed over-the-counter NSAIDs and told the patient that the pain would subside in its own in a week. The patient waited for a week and the pain did subside, but when he returned to practice, the pain returned once again, and in a more severe form. Here, the patient decided to visit the physical therapy clinic where this case study was conducted.

Physical Therapy Assessment and Diagnosis:

To accurately assess the patient, the MRI scan was studied and clinically correlated with the symptoms exhibited by the patient and the results of tests performed. The patient's MRIs displayed in figure 1 and 2 show inflammation at the patient's TFCC's articular disc. A clearer image of the TFCC wear would've appeared if the MRI scan was done with contrast injected, or if wrist arthroscopy was performed, since it's the gold standard in TFCC injuries' diagnosis. The patient didn't go through any other radiography or medical examinations.

Clinically, it was important to perform a series of tests and utilize assessment tools in order to reach a conclusive diagnosis.

Figure 1.: Ulnar view MRI

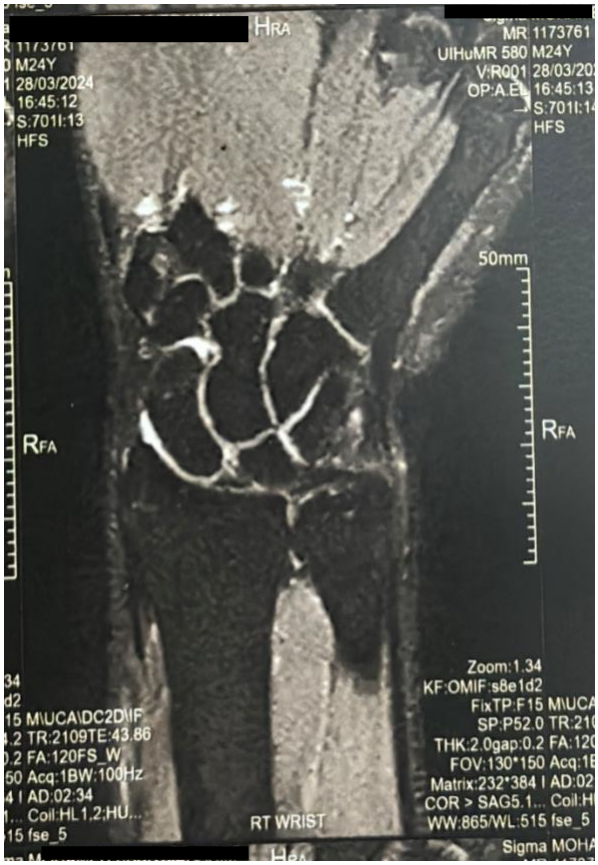

Figure 2.: Dorsal view MRI

Initial Physical Therapy Assessment (6/4/2024):

A) Inspection:

- The patient didn't show any signs of edema or inflammation.

B) Palpation:

- The patient showed signs of pain when palpation was performed on the ulnar aspect of the wrist, especially right above the ulnar styloid process.

C) Range of Motion (ROM):

- The wrists ROM was measured using a goniometer. (Measurement method demonstrated in Figure 3)
- Rom assessment showed Restriction in supination, pronation, ulnar deviation, flexion, and extension. ROM was free only in radial deviation. The restricted ROM was a result of pain and not any structural issues. The values of the restricted ROM varied according to the level of pain felt by the patient at that particular moment.

D) Special Tests:

1- Ulnar Fovea Sign: This test is done by pressing the thumb deep into the soft space among the ulnar styloid process and the flexor carpi ulnaris tendon distally. It indicates foveal disruption of the distal radioulnar ligaments and ulnotriquetral ligament injuries.

- Test result: Positive

2- Piano Key Sign: The wrist is placed into pronation, and the hand is stabilised. Observe the dorsal ulnar prominence relative to radius, then the ulnar head is pushed in a volar direction.

- Test Result: Negative

3- Grind Test: Compress the radius and ulna and have the patient rotate the forearm.

- Test result: Positive

E) Functional Assessment:

1. Joint Position Sense (JPS): This assessment involves positioning the patient's wrist at a predetermined angle in either flexion or extension, then returning it to the neutral position. With the patient's eyes covered to eliminate visual cues, they are asked to actively reproduce the same angle. The initial and reproduced angles are measured using a goniometer to determine positional accuracy.

- On average, the patient had a JPS error margin of 14 degrees in flexion, and 16 degrees in extension.
- Numerical Pain Rating Scale (NPRS): The NPRS is an 11-point scale used to assess a patient's perceived pain intensity, where **0**

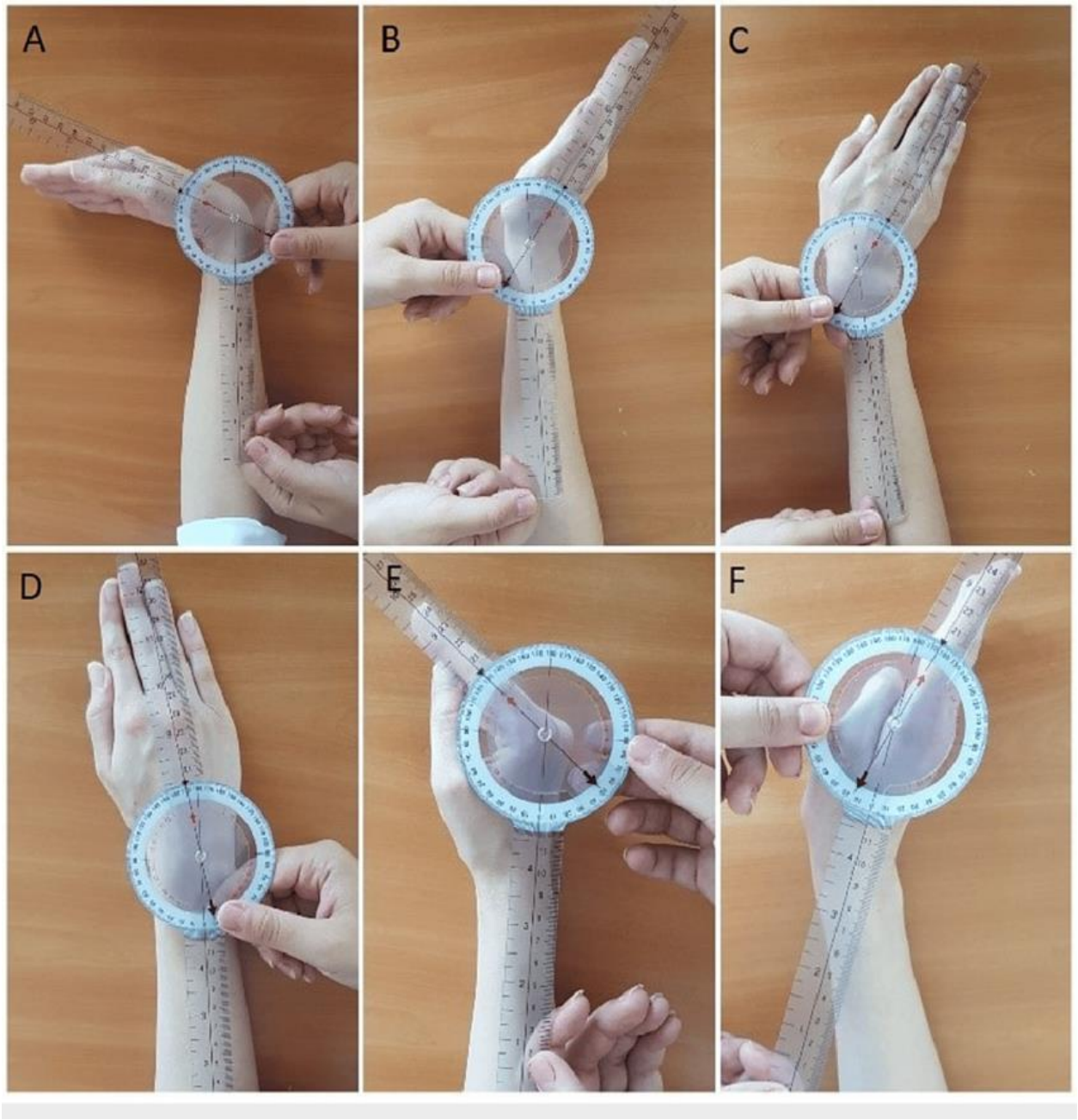

Figure 3.: This figure demonstrates how a Goniometer is used to measure ROM in all directions in the wrist joint. (A) Wrist flexion. (B) Wrist extension. (C) Ulnar deviation. (D) Radial deviation. (E) Metacarpophalangeal flexion. (F) Metacarpophalangeal extension.

- represents “no pain” and **10** represents “the worst pain imaginable.” Patients are asked to select the number that best corresponds to their pain at rest, during activity, or over a specified time frame[10]. Here is how the patient performed in the NPRS:

- At rest: 4/10
- During movement: 8/10

2. DASH Outcome Measure: The disabilities of the arm, shoulder and hand (DASH) questionnaire is a self-administered region-specific outcome instrument developed as a measure of self-rated upper-extremity disability and symptoms. The DASH consists mainly of a 30-item disability/symptom scale, scored 0 (no disability) to 100.[11] The patient's DASH Outcome Measure questionnaire can be found in the appendix for this paper.

   Here is how the patient scored:

- DASH Symptom Score: 30.5
- DASH Sports Module Score: 81.25

3. Modified Mayo Wrist Score: The Modified Mayo Wrist Score requires both patient and physician participation in order to assess pain, the active flexion/extension arc (in comparison with the contralateral side), grip strength (in comparison with the contralateral side), and the ability to return to regular employment or activities. Scores range from 0 to 100 with a score of 0 indicating a worse wrist condition and 100 indicating a better wrist condition.

   Modified Mayo Wrist Score system: Excellent: 90-100 points, good: 80-89 points, fair: 65-79 points, poor <65 points.[12]

   The assessment parameters for the Modified Mayo Wrist score are displayed in Table 1.

   The patient's scores are displayed in Table 2.

Diagnosis:

After the patient's initial assessment, the tests came out positive for TFCC wear (Type 2A) and showed ligamentous sprain of the 1st grade to ulnar side ligaments, with the distal radioulnar ligaments and the ulnotriquetral ligament being the most likely culprits. Also, no instability was noticed. Functionality-wise, it was evident that his injury is debilitating to a level that prevents him from practicing his sport in any capacity, albeit not as impactful in his daily activities.

Physical Therapy Interventions:

In this case, a program planned through emphasizing problem identification, setting goals, and applying the suitable interventions. The problem is divided into phases that ensure a speedy and safe return to practice.

A) Phase 1 (1 week):

This is the shortest phase of the rehabilitation plan. The focus here is on reducing pain. Conventionally, inflammation reduction is a defining feature in this phase. However, using the protocol PEACE &

LOVE proved to be the better solution, especially since the patient wasn't suffering from functionality-limiting edema, and helped finish this phase in a single week.

- Goals:

1- Reduce pain.

2- Overcome fear of movement.

3- Avoid deconditioning.

4- Increase ROM.

- Intervention: In this phase, PEACE & LOVE protocol was used. Evolving from ICE to RICE, then on to PRICE and POLICE, PEACE & LOVE gives an opportunity to the body to self-heal without any external hindrance to the inflammatory process.[13]

The PEACE half of management takes part in the acute stage.

1- P: Protection was achieved through using a wrist brace, to be worn during the day, as a splint to prevent undue stresses on the TFCC.

2- E: Elevation was recommended to the patient as a method of decreasing the throbbing pain felt.

3- A: Avoiding anti-inflammatories, whether medications or cryotherapy, is an important part of this protocol. Inflammation is a part of the healing process and inhibiting it may reduce recovery.

4- C: Compression wasn't needed in this case since there wasn't any significant swelling.

5- E: Education played a huge role in reducing the patient's fear. Explaining to him the nature of the injury and his expected recovery timeline helped him stay motivated and not shy from challenging himself in the upcoming phases.

After PEACE, comes the LOVE part, which is less of a first aid guide and more directed at the days after the injury.

1- L: Loading is encouraged early on in the treatment process. Through mechanotransduction, optimal loading without exacerbating pain is vital in promoting repair and tolerance in the joint and its surrounding structures.[14]

2- O: Optimism represents the psychological part of this approach. The psyche of the patient can determine his attitude throughout his rehabilitation.

3- V: Vascularization in this was achieved through active movement, Maitland grade 1 mobilization, and high frequency high intensity dual electrode interferential current.[15]

4- E: Exercising started since the patient's 2nd session. Low level manual resistance, within tolerable pain levels, in all wrist mobility directions was provided to maintain the patient's strength level and avoid deconditioning.

Category	*Parameter*	*Score*
Pain	No Pain	25
	Mild Occasional	20
	Moderate Tolerable	15
	Severe to Intolerable	0
Functional Status	Regular Employment	26
	Restricted Employment	20
	Able to Work, Unemployed	15
	Unable to Work Due to Pain	0
Range of Motion %	100	25
	75-99	20
	50-74	15
	25-49	10
	0-24	0
Grip Strength %	100	25
	75-99	20
	50-74	15
	25-49	10
	0-24	0

Table 1.: Modified Mayo Wrist Score Assessment System

Category	*Score*
Functional Status	0
Pain	15
Range of Motion	20
Grip Strength	15
Total	*50 / 100 (Poor)*

Table 2.: Pre-treatment Modified Mayo Wrist Score of the Patient

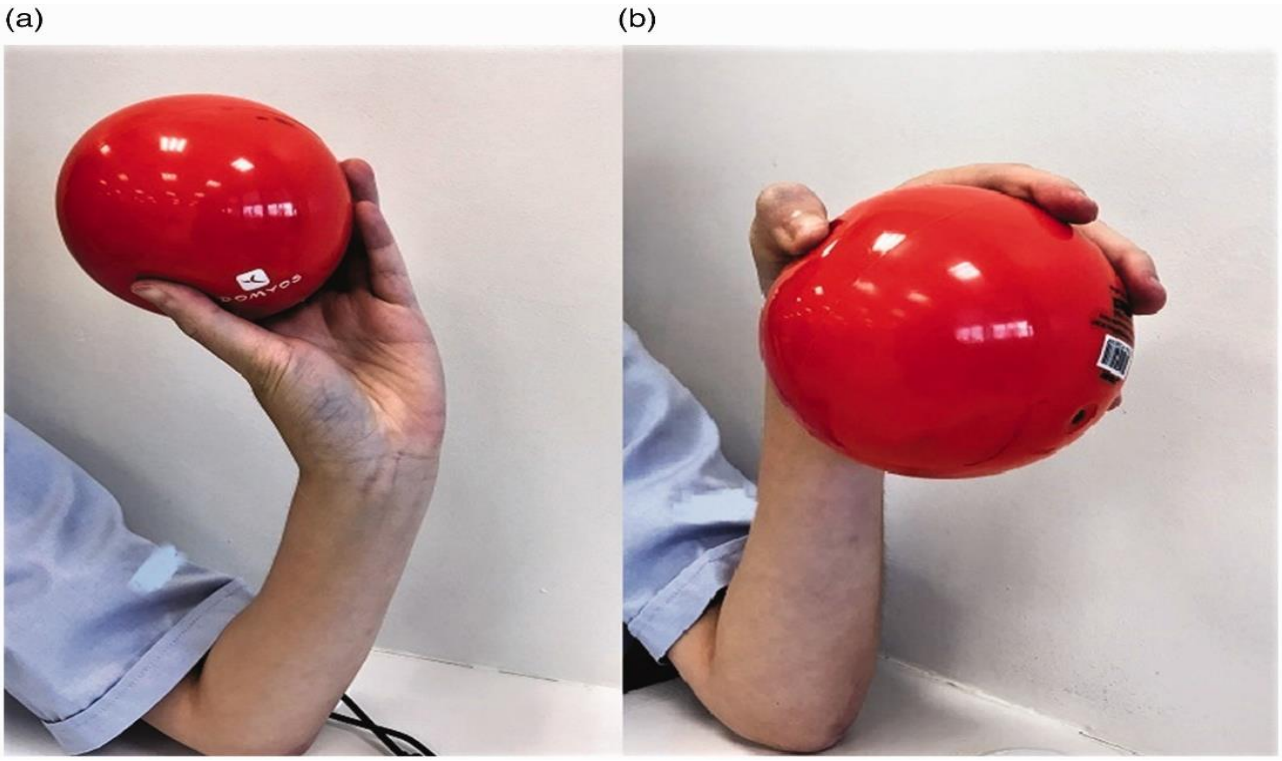

Figure 4: A demonstration of the dart throwing motion

Figure 5: The patient pushing on the ball with his ulnar side

B) Phase 2 (3 weeks):

After The pain relatively subsided and the patient's ROM increased, sensorimotor rehabilitation along with muscle strengthening are initiated in order to fully eliminate pain and avoid deconditioning while offering a window for gradual progression to prevent injury recurrence.

- Goals:

1- Muscle re-education.

2- Slowly return to light daily activities.

3- Fully eliminate pain.

- Intervention: Throughout this phase, isometric and functional movement exercises are pivotal for the achievement of joint stability, controlled movement, and prevention of injury recurrence.

1- Controlled isotonic dart throwing motion exercise, initially with a 1 kg ball for 3 sets x 15 repetitions 3 times a week, is great for restoring wrist motion in the most functionally used plane with the least effort needed.[16] This exercise was performed for 5 sets x 20 repetitions daily (30 second holds). Figure 4

2- Isometric exercises for the pronator quadratus and the extensor carpi ulnaris are crucial for increasing the distal radioulnar joint stability. To isolate the pronator quadratus, the patient is instructed to pronate the forearm with their contralateral hand positioned at the distal radius to resist pronation. For the extensor carpi ulnaris isometric contraction, patients are instructed to extend the wrist against the contralateral fingers cupping the ulnar side of the hand a providing a counter force to the ulnar wrist movement. These isometric exercises were performed for 5 sets x 20 repetitions daily (30 second holds).

3- Weightbearing on the wrist assists in boosting joint proprioception, coordination and stability. In this stage, partial weightbearing with the patient staying in a static wall push-up position is sufficient.

4- Dumbbell grips were used for increasing grip strength. The patient was initially able to hold a 10 kg dumbbell for 1 minute and 30 seconds without pain; this progressed to 15 kg for 2 minutes by the beginning of the 3rd week. This exercise was repeated daily for 2 repetitions.

Progression to the next and final phase of the rehabilitation program depended on the complete elimination of pain in any of the previously mentioned exercises.

C) Phase 3 (4 weeks):

By now, the patient's pain has completely subsided, and he participated in

some active functional exercises. This final phase included all the previous exercises with some progression as well as proprioception and coordination exercises. This phase ultimately aimed to discharge the patient with him ready to return to practice table tennis once again.

- Goals:

1- Neuromuscular rehabilitation.

2- Return to normal function.

- Intervention: At this phase, the strengthening exercises go on. However, the proprioception and joint sense exercises are ramped up to ensure a safe return to practice.

1- The pronator quadratus and the extensor carpi ulnaris isometric exercises are progressed to light resistance TheraBand exercises. This exercise was performed for 3 sets x 15 repetitions (3 times a week)

2- Weightbearing on the wrist was progressed from wall stands to pushing on a chair's handle and elevating himself. This exercise was performed for 3 sets x 20 repetitions (3 times a week).

3- Loading on a gym ball on a wall was performed using the ulnar and the palmar sides of the hand (Figure 5). The patient was asked, in both hand positions, to push on the ball the roll his hand up, down, and diagonally in both diagonals. This exercise increased the patient's proprioception and multi joint coordination. Performed for 3 minutes in each direction for 3 times a week.

4- Dumbbell grips were used for increasing grip strength. This exercise was progressed with TheraBand assisted one handed pull-up holds (dead hangs) for 30 seconds. By the end of the 4 weeks, the patient was able perform the same exercise without any assistance. This exercise was performed for 3 repetitions 3 times a week.

5- Reaction training took part in this phase. The patient was told to hold a tennis ball and repeatedly drop and catch it mid-air. Variations were dropping it and catching it from the top and sometimes, to include a supination component, he would catch it from the bottom. The patient would perform both variations for 3 minutes (3 times a week)

Outcomes:

Having thoroughly examined the intricacies and context of the case, it is now imperative to shift our focus to the outcomes. By exploring them, we can gain a deeper understanding of the impact and significance of the actions and decisions made throughout the process. To clarify the outcomes derived from the physical therapy intervention at this stage of treatment, the reassessment conducted on June 2, 2024, would be pivotal.

Latest Physical Therapy Assessment (2/6/2024):

A) Range of Motion (ROM): No restrictions

B) Joint Position Sense (JPS): The patients wrist would be placed at a specified degree in both flexion and extension and back to neutral, then the patient would be asked to reproduce the same angle. On average, the patient had an error margin of 3 degrees in flexion, and 5 degrees in extension.

C) Numerical Pain Rating Scale (NPRS):
- At rest: 0/10
- During movement: 0/10

D) DASH Outcome Measure:
- DASH Symptom Score: 0
- DASH Sports Module Score: 6.25

E) Modified Mayo Wrist Score: *See Table 3*

Category	*Score*
Functional Status	25
Pain	25
Range of Motion	25
Grip Strength	25
Total	*100 / 100 (Excellent)*

Table 3.: Post-treatment Modified Mayo Wrist Score

After the patient's pre-discharge reassessment, the improvement was evident. The patient had no ROM restrictions, his JPS improved by 11 degrees in both flexion and extension (7 degrees improvement is the minimal clinically important improvement), his pain was non-existent, his DASH symptom score dropped to 0 (15 points is the minimum clinically importance difference)[17], and his Modified Mayo Wrist score became perfect.

The only comment on his reassessment would be the DASH Sporting Module score of 6.25. Despite the huge improvement, the patient complained of mild difficulty playing table tennis as well as he'd like. This issue would most likely subside after he returns to practice the sport regularly, regaining the game sense that might have been affected from his absence. At the patient's discharge, kinesiotape was applied as a way to promote stability during playing table tennis until the patient regains his pre-injury playing sense.

This case study discusses the physical therapy intervention for an athletic patient that was forced to put his table tennis career on hold as a result of a TFCC injury. The patient's therapy regimen is focused on reducing the pain and regaining his functional abilities, returning him back to his practice as soon and as safely as possible. The case study also highlights the importance of an individualized and adaptive physical therapy program in managing sport-related injuries, since they can be detrimental to the patient's career if not managed properly.

When looking at the available literature, it's obvious that the usual fir 63 of treatment is surgical intervention, most commonly arthroscopic debridement. However, studies that delve into conservative management of TFCC injuries, especially type 2, has found that the results are quite similar to the surgical options[16,18]. This opens a door for eligible patients to manage their TFCC injuries without having to deal with the complications and cost of surgery.

Discussion

This case discussed an undiagnosed case of TFCC Type 2A in an athletic patient. Being an athlete with a career threatening injury is bad enough, but managing the case with only painkillers would be an avoidable mistake that might end his career. The patient's awareness and the physical therapy regimen tailored specifically to his case has successfully returned him to practicing table tennis.

For future notice, it would have been an easier diagnosis if the patient underwent arthroscopy, since it's the gold standard for TFCC diagnosis. As for the physical therapy regimen, it would've been beneficial to reintroduce the patient to his sport in a low effort frame by the 4th week, this would've eliminated the patient's feeling of the mild difficulty at playing the way he'd like.

To conclude, it's quite evident that physical rehabilitation for a TFCC injury patient is of the utmost importance and can lead to satisfactory results. A program that promotes joint stability, proprioceptio 64 l muscular strength proved to be capable of getting the patient back to practice.

Acknowledgments

I would like to express my deepest gratitude to Dr. Ahmed Hesham and the management of Cure Physical Therapy Center for their valuable assistance throughout this case study.

Abbreviations: Triangular Fibrocartilage Complex (TFCC), Numerical Pain Rating Scale (NPRS). Range of Motion (ROM), Joint Position Sense (JPS)

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A) Patient's Wrist MRI:

Figure 5

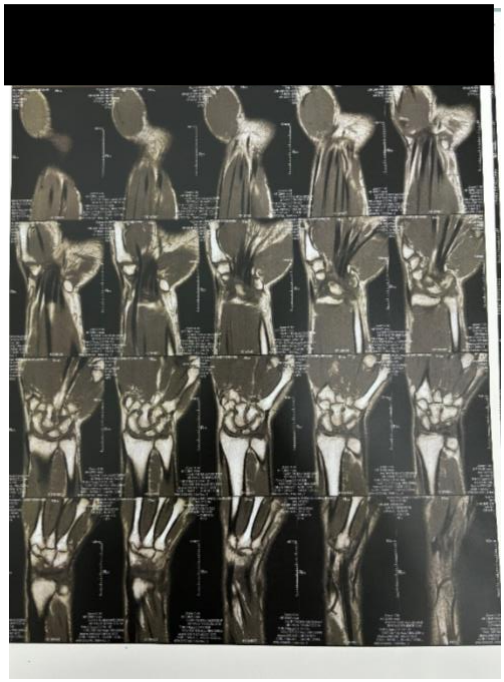


Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

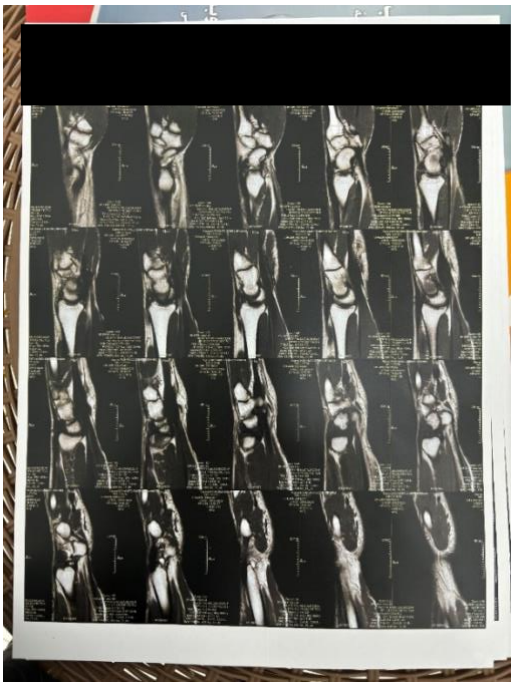
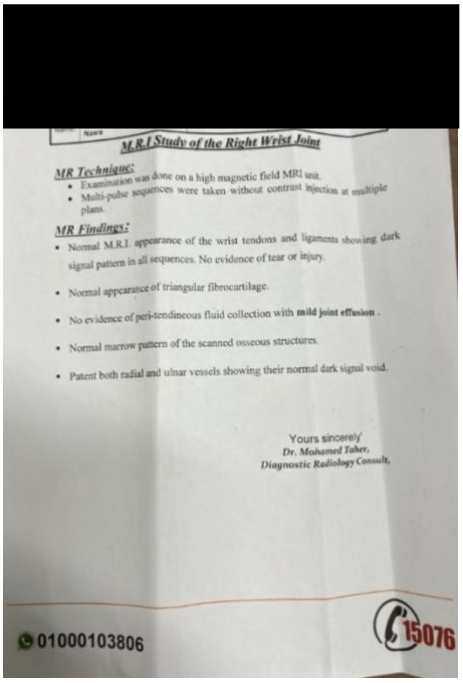


Figure 11



M.R.I Study of the Right Wrist Joint

MR Technique:

- Examination was done on a high magnetic field MRI unit.
- Multi-pulse sequences were taken without contrast injection at multiple plans.

MR Findings:

- Normal M.R.I. appearance of the wrist tendons and ligaments showing dark signal pattern in all sequences. No evidence of tear or injury.
- Normal appearance of triangular fibrocartilage.
- No evidence of peri-tendineous fluid collection with **mild joint effusion** .
- Normal marrow pattern of the scanned osseous structures.
- Patent both radial and ulnar vessels showing their normal dark signal void.

Yours sincerely
Dr. Mohamed Taher,
Diagnostic Radiology Consult,

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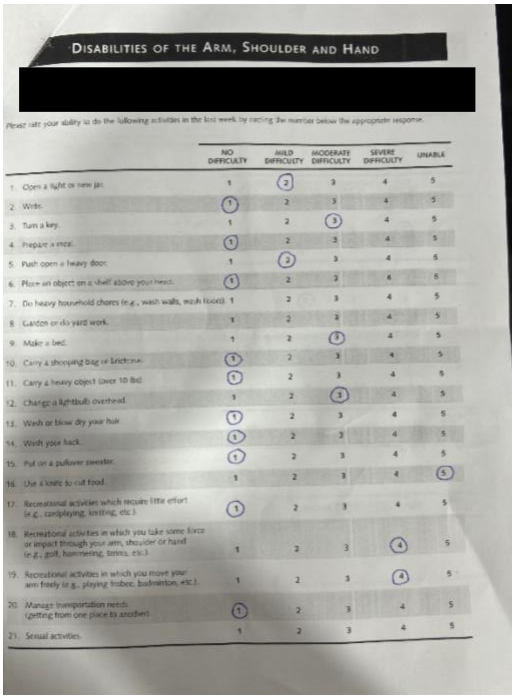
Figure 12

B) Patients DASH questionnaire pre-rehab:



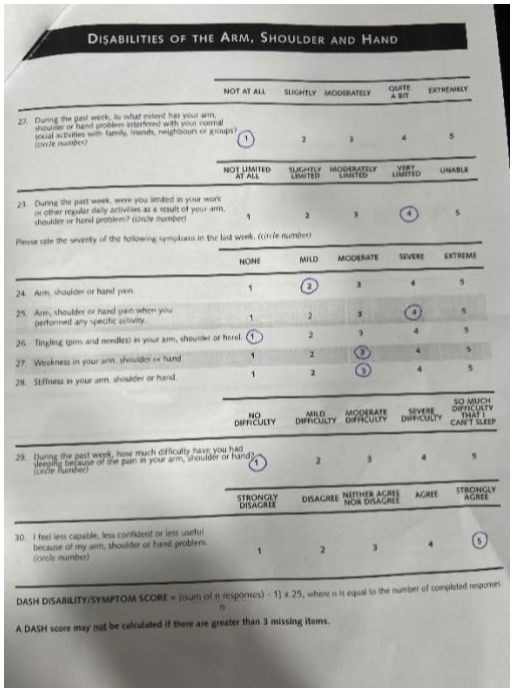
DISABILITIES OF THE ARM, SHOULDER AND HAND

[redacted]

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	1	(2)	3	4	5
2. Write.	(1)	2	3	4	5
3. Turn a key.	1	2	(3)	4	5
4. Prepare a meal.	(1)	2	3	4	5
5. Push open a heavy door.	1	(2)	3	4	5
6. Place an object on a shelf above your head.	(1)	2	3	4	5
7. Do heavy household chores (e.g., wash walls, wash floors).	1	2	3	4	5
8. Garden or do yard work.	1	2	3	4	5
9. Make a bed.	1	2	(3)	4	5
10. Carry a shopping bag or briefcase.	(1)	2	3	4	5
11. Carry a heavy object (over 10 lbs).	(1)	2	3	4	5
12. Change a lightbulb overhead.	1	2	(3)	4	5
13. Wash or blow dry your hair.	(1)	2	3	4	5
14. Wash your back.	(1)	2	3	4	5
15. Put on a pullover sweater.	(1)	2	3	4	5
16. Use a knife to cut food.	1	2	3	4	(5)
17. Recreational activities which require little effort (e.g., cardplaying, knitting, etc.).	(1)	2	3	4	5
18. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	1	2	3	(4)	5
19. Recreational activities in which you move your arm freely (e.g., playing frisbee, badminton, etc.).	1	2	3	(4)	5
20. Manage transportation needs (getting from one place to another).	(1)	2	3	4	5
21. Sexual activities.	1	2	3	4	5

Figure 13



DISABILITIES OF THE ARM, SHOULDER AND HAND

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
22. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups? (circle number)	(1)	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
23. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem? (circle number)	1	2	3	(4)	5

Please rate the severity of the following symptoms in the last week. (circle number)

	NONE	MILD	MODERATE	SEVERE	EXTREME
24. Arm, shoulder or hand pain.	1	(2)	3	4	5
25. Arm, shoulder or hand pain when you performed any specific activity.	1	2	3	(4)	5
26. Tingling (pins and needles) in your arm, shoulder or hand.	(1)	2	3	4	5
27. Weakness in your arm, shoulder or hand	1	2	(3)	4	5
28. Stiffness in your arm, shoulder or hand.	1	2	(3)	4	5

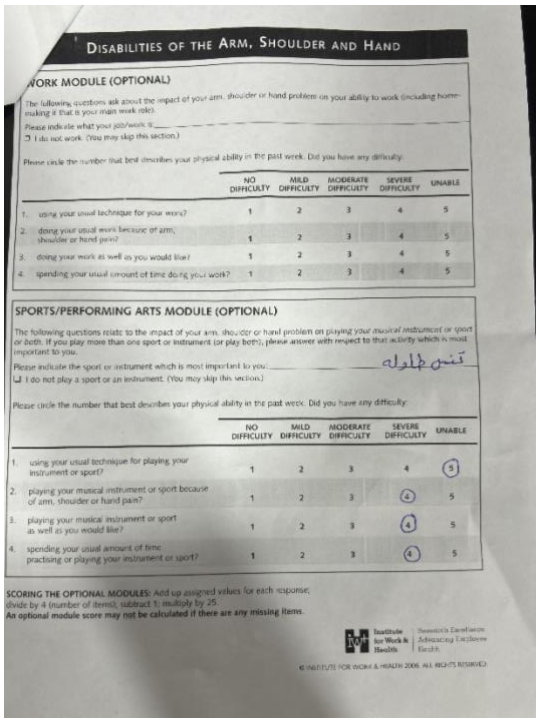
	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
29. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? (circle number)	(1)	2	3	4	5

	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
30. I feel less capable, less confident or less useful because of my arm, shoulder or hand problem. (circle number)	1	2	3	4	(5)

DASH DISABILITY/SYMPTOM SCORE = [(sum of n responses) − 1] x 25, where n is equal to the number of completed responses.
n

A DASH score may not be calculated if there are greater than 3 missing items.

Figure 14



DISABILITIES OF THE ARM, SHOULDER AND HAND

WORK MODULE (OPTIONAL)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including home-making if that is your main work role).

Please indicate what your job/work is _____

❑ I do not work. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for your work?	1	2	3	4	5
2. doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
3. doing your work as well as you would like?	1	2	3	4	5
4. spending your usual amount of time doing your work?	1	2	3	4	5

SPORTS/PERFORMING ARTS MODULE (OPTIONAL)

The following questions relate to the impact of your arm, shoulder or hand problem on playing your musical instrument or sport or both. If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: تنس طاوله

❑ I do not play a sport or an instrument. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for playing your instrument or sport?	1	2	3	4	(5)
2. playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	(4)	5
3. playing your musical instrument or sport as well as you would like?	1	2	3	(4)	5
4. spending your usual amount of time practising or playing your instrument or sport?	1	2	3	(4)	5

SCORING THE OPTIONAL MODULES: Add up assigned values for each response; divide by 4 (number of items); subtract 1; multiply by 25.
An optional module score may not be calculated if there are any missing items.

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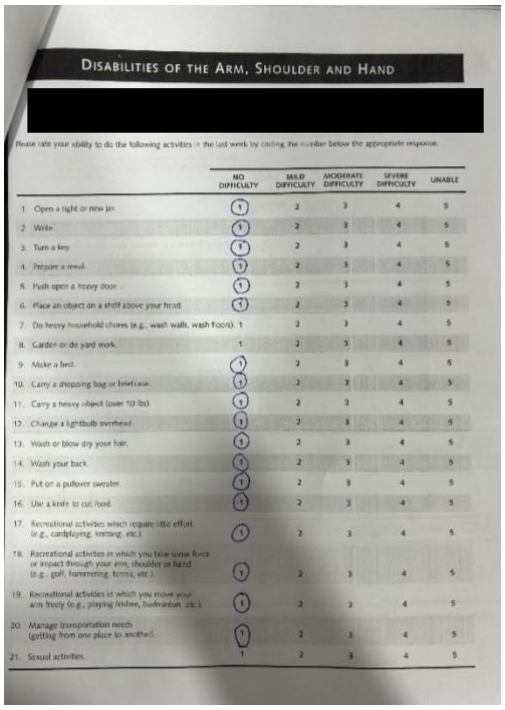
C) Patients DASH questionnaire post-rehab:

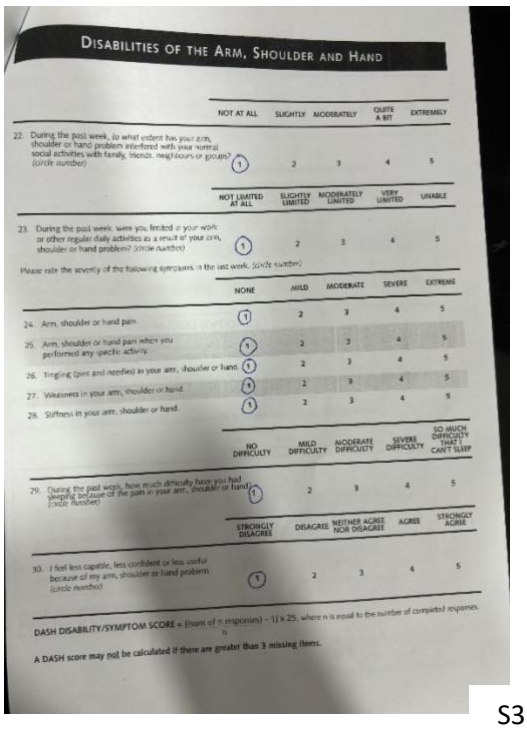


DISABILITIES OF THE ARM, SHOULDER AND HAND

Please rate your ability to do the following activities in the last week by circling the number below the appropriate response.

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. Open a tight or new jar.	1	2	3	4	5
2. Write.	1	2	3	4	5
3. Turn a key.	1	2	3	4	5
4. Prepare a meal.	1	2	3	4	5
5. Push open a heavy door.	1	2	3	4	5
6. Place an object on a shelf above your head.	1	2	3	4	5
7. Do heavy household chores (e.g., wash walls, wash floors).	1	2	3	4	5
8. Garden or do yard work.	1	2	3	4	5
9. Make a bed.	1	2	3	4	5
10. Carry a shopping bag or briefcase.	1	2	3	4	5
11. Carry a heavy object (over 10 lbs).	1	2	3	4	5
12. Change a lightbulb overhead.	1	2	3	4	5
13. Wash or blow dry your hair.	1	2	3	4	5
14. Wash your back.	1	2	3	4	5
15. Put on a pullover sweater.	1	2	3	4	5
16. Use a knife to cut food.	1	2	3	4	5
17. Recreational activities which require little effort (e.g., cardplaying, knitting, etc.).	1	2	3	4	5
18. Recreational activities in which you take some force or impact through your arm, shoulder or hand (e.g., golf, hammering, tennis, etc.).	1	2	3	4	5
19. Recreational activities in which you move your arm freely (e.g., playing frisbee, badminton, etc.).	1	2	3	4	5
20. Manage transportation needs (getting from one place to another).	1	2	3	4	5
21. Sexual activities.	1	2	3	4	5

Figure 16



DISABILITIES OF THE ARM, SHOULDER AND HAND

	NOT AT ALL	SLIGHTLY	MODERATELY	QUITE A BIT	EXTREMELY
22. During the past week, to what extent has your arm, shoulder or hand problem interfered with your normal social activities with family, friends, neighbours or groups? (circle number)	1	2	3	4	5

	NOT LIMITED AT ALL	SLIGHTLY LIMITED	MODERATELY LIMITED	VERY LIMITED	UNABLE
23. During the past week, were you limited in your work or other regular daily activities as a result of your arm, shoulder or hand problem? (circle number)	1	2	3	4	5

Please rate the severity of the following symptoms in the last week. (circle number)

	NONE	MILD	MODERATE	SEVERE	EXTREME
24. Arm, shoulder or hand pain.	1	2	3	4	5
25. Arm, shoulder or hand pain when you performed any specific activity.	1	2	3	4	5
26. Tingling (pins and needles) in your arm, shoulder or hand.	1	2	3	4	5
27. Weakness in your arm, shoulder or hand.	1	2	3	4	5
28. Stiffness in your arm, shoulder or hand.	1	2	3	4	5

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	SO MUCH DIFFICULTY THAT I CAN'T SLEEP
29. During the past week, how much difficulty have you had sleeping because of the pain in your arm, shoulder or hand? (circle number)	1	2	3	4	5

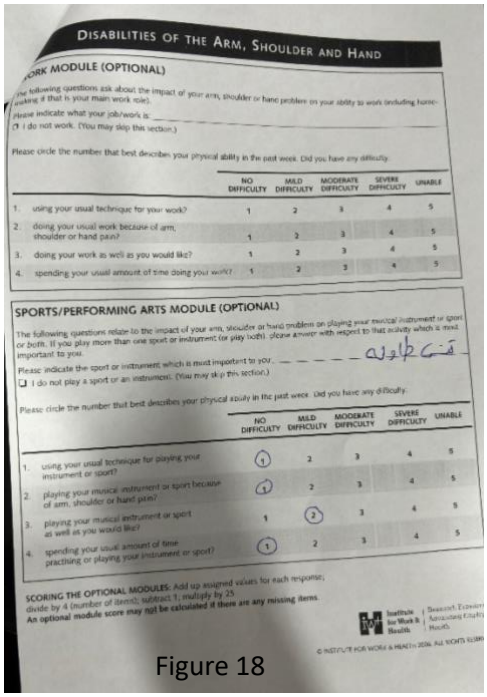
	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE NOR DISAGREE	AGREE	STRONGLY AGREE
30. I feel less capable, less confident or less useful because of my arm, shoulder or hand problem. (circle number)	1	2	3	4	5

DASH DISABILITY/SYMPTOM SCORE = $\left(\frac{\text{sum of } n \text{ responses}}{n}\right) - 1 \times 25$, where n is equal to the number of completed responses.

A DASH score may not be calculated if there are greater than 3 missing items.

Figure 15

Figure 17



DISABILITIES OF THE ARM, SHOULDER AND HAND

WORK MODULE (OPTIONAL)

The following questions ask about the impact of your arm, shoulder or hand problem on your ability to work (including housework if that is your main work role).

Please indicate what your job/work is: _____

☐ I do not work. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for your work?	1	2	3	4	5
2. doing your usual work because of arm, shoulder or hand pain?	1	2	3	4	5
3. doing your work as well as you would like?	1	2	3	4	5
4. spending your usual amount of time doing your work?	1	2	3	4	5

SPORTS/PERFORMING ARTS MODULE (OPTIONAL)

The following questions relate to the impact of your arm, shoulder or hand problem on playing your musical instrument or sport or both. If you play more than one sport or instrument (or play both), please answer with respect to that activity which is most important to you.

Please indicate the sport or instrument which is most important to you: _____ Guitar

☐ I do not play a sport or an instrument. (You may skip this section.)

Please circle the number that best describes your physical ability in the past week. Did you have any difficulty:

	NO DIFFICULTY	MILD DIFFICULTY	MODERATE DIFFICULTY	SEVERE DIFFICULTY	UNABLE
1. using your usual technique for playing your instrument or sport?	1	2	3	4	5
2. playing your musical instrument or sport because of arm, shoulder or hand pain?	1	2	3	4	5
3. playing your musical instrument or sport as well as you would like?	1	2	3	4	5
4. spending your usual amount of time practising or playing your instrument or sport?	1	2	3	4	5

SCORING THE OPTIONAL MODULES: Add up assigned values for each response; divide by 4 (number of items); subtract 1; multiply by 25.
An optional module score may not be calculated if there are any missing items.

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Figure 18