Clinical Finding Form (CliFF)

Branch | Baseline

ICL33_Dislocation - Finger

Dislocation of a joint occurs when traumatic forces cause complete loss of continuity between the joint's 2 articulating surfaces. Dislocations of the finger joints involve either the interphalangeal (IP) joint or the metacarpo-phalangeal (MCP) joint. Causes for dislocation may include hyper-extension (most-common), hyper-flexion, ulnar or radial stress, axial load, or injury caused by direct pressure or crushing. (Harvard Health, 2021)

INCIDENCE DATA INCLUDED IN THE MODEL

The model imports the following incidence information from the MEDPRAT Evidence Library Database: incidence data category, space adaption status, EVA status, incidence data type, incidence and occurrence distribution data and incidence data characteristics. Data category defines the type of data available for incidence calculations (i.e. raw data vs. adjusted data). Space adaptation identifies medical events that where onset occurs in the first 5-7 days of flight and does not reoccur. EVA-related incidence values identify medical events that occur only during an EVA. Incidence values types vary by data category and define the number of medical events per person-year (rates) or medical events per person at-risk (proportion) for each medical condition. Incidence values can be modified by crew characteristics such as gender sex and certain crew medical history characteristics. Modifying characteristics are noted below and incidence values are listed individually for each characteristic. Distributions are assigned to medical events incidence values and occurrences in the model. For each crewmember in a given trial, the incidence and number of occurrences of each medical condition are randomly selected from these probability distributions. Detailed descriptions of the distributions are included in the MEDPRAT Technical Description Document.

INCIDENCE DATA

SPACEFLIGHT LITERATURE

There is anecdotal evidence of one finger dislocation having occurred in spaceflight, during Skylab (Collins, 1988). This is captured as a non-specific dislocation in Scheuring, 2009 and as a finger dislocation on NASA's Human Research Program's "Human Research Wiki" page for "Finger Dislocation" (Human Research Program, NASA, 2014). Notably, it is not included in the official Skylab list of events (Hordinsky, 1977).

ANALOG LITERATURE

No relevant studies describing the incidence of finger dislocation in spaceflight analog environments were found through a search according to the protocols outlines in the evidence library methods.

TERRESTRIAL LITERATURE

Terrestrial incidence is between 4.6-29.9/100,000/yr depending on the population being studied. The difference in incidence is thought to be due to differences in activities (such as American football). Hindle et al, 2013 found that 8% of finger dislocations required general anesthesia for reduction.

OVERALL INCIDENCE SUMMARY

INCIDENCE

Mean: 0.01676
SD: 0.01667

INCIDENCE SUMMARY

There has been one reported case of dislocated finger in spaceflight, during a Skylab mission. Therefor this occurrence was used to calculate a true incidence of finger dislocation in the U.S. Space Program by calculating person-years of flight for NASA astronauts through April 26, 2021 (flights landed by April 26, 2021). Gamma (shape=1.011, rate=60.31) mean: 0.01676 SD: 0.01667. This reflects the Bayesian posterior distribution for the incidence rate given the inflight data using an uninformative prior.

TABLE 1. INCIDENCE MODEL

Incidence Details

Incidence Type

General

Segment
All

Env. Exposure
NA

Sex
Any

Crowns
Any

Contacts
Any

Pregnancy
Any

Incidence Distribution

Occurrence Dist
Poisson

Incidence Dist.
Gamma

Mean
0.0167634

SD
0.0166719

Gamma
(Shape): 1.011
(Rate): 60.31

TABLE 2. INCIDENCE LEVEL OF CONFIDENCE (LOC)

Citation	Source	LOC Value
Hindle et al, 2013	Terrestrial	3
Golan et al, 2016	Terrestrial	3
Yang et al, 2011	Terrestrial	3
Scheuring, 2009	Spaceflight	4
Collins, 1988	Spaceflight	3
Human Research Program, NASA, 2014	Spaceflight	4

Collins, 1988 provides anecdotal evidence of a finger dislocation having occurred during Skylab (which is reported elsewhere in Scheuring, 2009 and Human Research Program, NASA, 2014). All of the terrestrial studies included patients of all ages and health status, making them less applicable to the astronaut corps. Golan et al encompassed only ER presentations.

CREWMEMBER SELECTION/PREVENTION

DISQUALIFYING CONDITIONS

Refer to Medical Evaluation Documents (MED) Volume A, Medical Standards for ISS Crewmembers, International Space Station Program, Rev 3.4 (2016).

PREFLIGHT PREVENTATIVE MEASURES

There are no required preventive measures for finger dislocation.

BEST CASE SCENARIO DEFINITION

A finger dislocation that is easily reduced and has full range of motion after a period of splinting and physical therapy.

WORSE CASE SCENARIO DEFINITION

A finger dislocation that cannot be reduced (requires surgery), or has persistent decreased ROM after reduction, splinting, and PT.

CONDITIONS INCLUDED, BUT NOT EXPLICITLY STATED (CNES)

None

BEST CASE/WORST CASE PROBABILITY COMMENTS

Based on Hindle et al, 2013 there is an 8% worst-case probability. This refers to the percentage of patient's with dislocated fingers requiring general anesthesia for reduction. This is per the WC definition of "A finger dislocation that cannot be reduced (requires surgery), or has persistent decreased ROM after reduction, splinting, and PT." Rates of persistent decreased ROM after reduction were not found in literature, but general anesthesia is used here as a proxy for "requires surgery."

TABLE 3.BEST/WORST CASE PROBABILITY LEVEL OF CONFIDENCE (LOC)

Citation	Source	LOC Value
Hindle et al, 2013	Terrestrial	3

Hindle et al provide a retrospective 1 year review from patients age birth to death in Edinburgh and 2 surrounding communities in Scotland from 2008-2009. Of the finger dislocations that occurred during this time, 8% required general anesthesia for reduction.

TABLE 4. CLIFF TREATMENT & OUTCOME TABLE BY CLINICAL PHASE

Case Scenario	Composite Incidence	Condition Probability %	CP1: Diagnosis		CP2: Treatment			CP3: Condition End State				
			TI%	Duration	TI%	Duration		TI%	RTDC		LOCL	
			Preset	Preset	Preset	Min	Max	Preset	Min%	Max%	Min%	Max%
Treated Best Case (TBC)	Mean: 0.01676 SD: 0.01667	92 - 92	100	1.25	13.3803	336	672	0	0	0	0	0
Treated Worst Case (TWC)		8 - 8	100	1.25	13.3803	672	1344	0	0	0	0	0
Untreated Best Case (UTBC)	N/A	N/A	N/A	1.25	20.9009	336	672	9.11507	0	0	0	0
Untreated Worst Case (UTWC)	N/A	N/A	N/A	1.25	20.9009	1008	1344	9.11507	0	0	0	0

TABLE 4 KEY

Composite Incidence: The same composite incidence will be used for both TBC and TWC. For EVA conditions: events per EVA (events/EVA). For space adaptation conditions: events per person (events/person). For non-spaceflight conditions: events per person year (events/py).

Condition Probability: The probability that CLiFF condition progresses to a worst case scenario. Best case scenario: 100%-Worst Case.

Clinical Phase General Comments:

- TI% = Task Impairment %. Task Impairment is the % of tasks that the crewmember is incapable of performing without impairment secondary to the medical condition.
- Durations are defined in hours.
- Removal to Definitive Care (RTDC): The probability the entire crew aborts the mission and returns to earth. This is considered as a condition end state result if any of the following criteria are met: 1) the potential for LOCL, 2) potential for significant permanent task impairment, or 3) potential for intractable pain.
- Loss of Crew Life (LOCL): The probability of death of affected crewmember due to medical condition.

Clinical Phase 1: Initial Assessment and Diagnosis:

- Covers only the initial assessment and diagnosis of the affected crewmember to define his or her medical condition. While the affected crewmember is being assessed, he or she is not able to perform any assigned tasks, thus Task Impairment (TI) during this phase is considered 100%. In the untreated case, there is no diagnosis performed, therefore Task Impairment and Duration will always be " not applicable."

Clinical Phase 2: Stabilization, Treatment, and Convalescence:

- The affected crewmember is receiving any appropriate initial or follow-on treatment for his or her medical condition to allow the crewmember to recover as much as he or she is able to recover in the spaceflight environment. Clinical phase 2 also encompasses relapses or recurrences of the same original medical condition in Clinical Phase 1. The duration of Clinical Phase 2 is expressed as minimum and maximum hours.

Clinical Phase 3: Condition End State:

- Reached once the affected crewmember has recovered from the medical condition as much as he or she is able to recover in the spaceflight environment amongst treated and untreated best and worst case scenarios. This may or may not be recovery from the given medical condition to the full extent possible. If this “recovered” state results in Removal to Definitive Care (RTDC) or Loss of Crew Life (LOCL) this will be noted in the condition end state results.

SCENARIO OVERVIEW COMMENTS

RTDC was pre-determined by ExMC Clinical and Science Team to be 0% for all scenarios. Thus there was no RTDC surrogate used and no RTDC literature searches were performed. See specific scenario comments below.

TREATED BEST CASE (TBC) SCENARIO COMMENTS

Best case scenario treatment was viewed as including manual reduction, splinting, and any necessary PT. Papers discussing more invasive treatments were not included as they are out of scope for this case. Duration was informed recommended treatment and healing time presented in Miller et al, 2020 for a variety of interphalangeal and metacarpophalangeal dislocations. Miller et al provided longer durations for "return to play" for athlete populations, but these were not considered applicable to the astronaut population. RTDC was pre determined as 0% by the ExMC Clinical & Science Team since this condition is not likely to exceed the capabilities of the spacecraft care system, so no RTDC literature search was performed. The LOCL literature search revealed no articles indicating a risk of loss of life due to finger dislocation. Additionally, finger dislocation is not associated with LOCL as functional fingers are not a vital organ system.

TREATED WORST CASE SCENARIO (TWC) COMMENTS

Duration was informed recommended treatment and healing time presented in Miller et al, 2020 for complex dislocations or dislocations requiring surgical reduction. Miller et al again provided longer durations for "return to play" for athlete populations, but these were not considered applicable to the astronaut population. RTDC was pre determined as 0% by the ExMC Clinical & Science Team since this condition is not likely to exceed the capabilities of the spacecraft care system, so no RTDC literature search was performed. The LOCL literature search revealed three articles, (Leggit et al, 2006; Miller et al, 2020; and Saitta et al 2018). The probability of LOCL was 0% in all articles.

UNTREATED BEST CASE (UTBC) SCENARIO COMMENTS

There is a paucity of data regarding completely untreated finger dislocations. It is suspected that resources could be improvised to treat a best-case dislocation, even in the absence of dedicated resources for this task. Thus, the assumption was made that the duration to maximum improvement would be similar between best-case treated and untreated scenarios (i.e. the untreated scenario uses the same duration values as the treated scenario). RTDC was pre determined as 0% by the ExMC Clinical & Science Team since this condition is not likely to exceed the capabilities of the spacecraft care system, so no RTDC literature search was performed. The LOCL literature search revealed no articles indicating LOCL. Thus, the probability of LOCL was assumed to be 0%.

UNTREATED WORST CASE (UTWC) SCENARIO COMMENTS

Miller et al, 2020 and Saitta et al, 2018 informed the duration values for the worst-case untreated scenario. The articles provided prolonging healing durations secondary to delayed treatment. This often resulted in permanent loss of motion and/or chronic pain. While worst-case finger dislocations may require surgical intervention, the estimated time to maximal recovery based on these articles was determined to be 6-8 weeks. RTDC was pre determined as 0% by the ExMC Clinical & Science Team since this condition is not likely to exceed the capabilities of the spacecraft care system, so no RTDC literature search was performed. Based o the lack of evidence for LOCL > 0% in prior scenario searches, the LOCL was assumed to be 0% for the worst-case untreated scenario and no searches were performed.

TABLE 5. CLINICAL PHASE II DURATION LEVEL OF CONFIDENCE (LOC)

Citation	Source	LOC Value
Miller et al, 2020	Terrestrial	3
Saitta et al, 2018	Terrestrial	

Duration data is based on treatment guidelines presented by Miller et al, 2020 and Saitta et al, 2018. The untreated best-case was assumed to be the same duration as the treated best case duration. The worst-case untreated duration is based off healing times presented in these papers for finger dislocation with delayed treatment.

TABLE 6. RTDC LEVEL OF CONFIDENCE (LOC)

Citation	Source	LOC Value
N/A	N/A	3

RTDC was pre-determined as 0% by the ExMC Clinical & Science Team since this condition is not likely to exceed the capabilities of the spacecraft care system, so no RTDC literature searches were performed. Thus, there are no references. This is likely an appropriate assumption but was not substantiated in the literature. Note, the IMM CLiFF did have values above 0% for evacuation.

TABLE 7. LOCL LEVEL OF CONFIDENCE (LOC)

Citation	Source	LOC Value
Leggit et al 2006	Terrestrial	3
Miller et al, 2020	Terrestrial	
Saitta et al, 2018	Terrestrial	

The treated worst-case scenario is the only literature search that resulted in relevant articles (and they presented LOCL probabilities of 0%). Note that no literature search was performed for the untreated worst-case scenario. It was assumed to be 0% based on prior searches.

CAPABILITY RESOURCE TABLE (CRT) OVERVIEW

Capabilities and Resourcing Scope

Overview

The condition Dislocation – Finger includes distal interphalangeal, proximal interphalangeal, and metacarpophalangeal joint dislocations of any finger (including the thumb) in any direction (volar, dorsal, or lateral). Note, this does not include fractures secondary to dislocation.

CNES: N/A

Diagnostic Scope and Resourcing

In both best- and worst-case scenarios, diagnosis is based on history, physical examination (musculoskeletal and neurologic), and imaging. Plain film (X-Ray), CT, and MRI will be unavailable inflight. Musculoskeletal ultrasound was included in the CRT as it may serve as a useful adjunct in diagnosis for some cases, but it was not considered a necessary capability to diagnose a dislocated finger. A digital finger block was also included as a capability that may assist the diagnosis (by allowing for a better physical exam) in the setting of no X-Ray capabilities. For the best-case scenario, the digital block was included but not considered a necessity, whereas it was considered a necessity in the worst-case scenario. This diagnostic framework is consistent with the terrestrial workup for finger dislocation with the exception of the inability to perform plain film X-Ray (and if warranted CT or MRI), and thereby using musculoskeletal ultrasound, with or without, a digital block as a possible surrogate.

Clinical Phase 1 Duration and Rationale
This version of IMPACT presumes physician level knowledge, skill, and ability will be present on the mission. The CRT working group SME consensus duration is as follows:

CP1 BC (Treated or Untreated): 1.25 hours
CP1 WC (Treated or Untreated: 1.25 hours

This CRT includes a scope of practice code of 5 (which correlates to an “Experienced procedure trained generalist attending (ED attending)” and was included for musculoskeletal ultrasound and interpretation.

Treatment Scope and Resourcing

Depending on the direction and joint involved in the dislocation, terrestrial management includes reduction, followed by a period of immobilization with a period of splinting followed by a period of buddy taping, or buddy taping only. Finger splints, buddy taping, and a customized thumb spica splint were included as resources in this CRT. Although 3D printing offers potential for splinting of musculoskeletal injuries, it remains a largely experimental process and it is not within the scope of this CRT. After immobilization, physical therapy is warranted. Exercise modification may also be needed but is not built into the CRT as this does not represent a clinical resource. Pain is variable. NSAIDs and acetaminophen were included in the best-case scenario. A short course of narcotics was added in the worst-case scenario.

Communications and Support Needs

While real-time video and audio loop communications are desired for diagnosis and treatment, they were not considered a necessity, in the best-case scenario. For the WC, consultation with ground specialists to facilitate treatment and healing was considered necessary given the limited diagnostic and treatment capabilities in-flight.

IMM CLIFF RECONCILATION COMMENTS

The best and worst-case scenario definitions are very similar between the IMM CLiFF and this CLiFF. The duration for best-case scenarios is the same between the IMM CLiFF and this CLiFF. The duration for the worst-case scenarios, however, is substantially longer in this CLiFF, which is felt to be appropriate based on literature review. IMM assigned RTDC values for this condition, but it was assumed to be 0% by the Clinical and Science Team and no literature searches were run regarding RTDC. LOCL probability for both the IMM CLiFF and this CLiFF was 0% for all scenarios.

LIMITATIONS SUMMARY

RTDC was assumed to be 0% by Clinical & Science team and no RTDC literature searches were performed. The untreated worst-case scenario LOCL was assumed to be 0% based on prior searches, but this was no substantiated by a literature search.

TABLE 8. TASK IMPAIRMENT CALCULATION BASED ON AFFECTED HUMAN SYSTEMS TASK CATEGORIES (HSTC)

Clinical Phase 2: Treatment												
	Affected HSTCs											
	Cognitive - Simple	Cognitive - Complex	Communications	Inter-personal Skills	Vision	Hearing	Cardio-pulmonary	Dentition	GI	GU		
Treated Best Case (TBC)		664										
Untreated Best Case (UTBC)	223	664										
Treated Worst Case (TWC)		664										
Untreated Worst Case (UTWC)	223	664										
	Affected HSTCs (Continued)								TI Calculation			TI Score
	Hand (Dom)	Hand (Any)	Upper Extremity	Lower Extremity	Ambul & Standing (g)	Translation & Stabilization (microgravity)	Don/Doff Equipment	Pressure Ops	Total Tasks Impaired By Condition	Total Human System Category Tasks Full Mission	TI Decimal	TI %
Treated Best Case (TBC)	132							211	1007	3763	0.267606	26.7606
Untreated Best Case (UTBC)	132							211	1230	3763	0.326867	32.6867
Treated Worst Case (TWC)	132							211	1007	3763	0.267606	26.7606
Untreated Worst Case (UTWC)	132							211	1230	3763	0.326867	32.6867

Clinical Phase 3: Condition End State												
	Affected HSTCs											
	Cognitive - Simple	Cognitive - Complex	Communications	Inter-personal Skills	Vision	Hearing	Cardio-pulmonary	Dentition	GI	GU		
Treated Best Case (TBC)												
Untreated Best Case (UTBC)												
Treated Worst Case (TWC)												
Untreated Worst Case (UTWC)												
	Affected HSTCs (Continued)								TI Calculation			TI Score

	Hand (Dom)	Hand (Any)	Upper Extremity	Lower Extremity	Ambul & Standing (g)	Translation & Stabilization (microgravity)	Don/Doff Equipment	Pressure Ops	Total Tasks Impaired By Condition	Total Human System Category Tasks Full Mission	TI Decimal	TI %
Treated Best Case (TBC)									0	3763	0	0
Untreated Best Case (UTBC)	132							211	343	3763	0.0911507	9.11507
Treated Worst Case (TWC)									0	3763	0	0
Untreated Worst Case (UTWC)	132							211	343	3763	0.0911507	9.11507

TABLE 8 KEY

Human System Task Category (HSTC) Definitions: Cognitive-Simple: Tasks requiring simple cognitive involvement (low levels of attention, following simple checklists, and not requiring extensive decision making) in conjunction with inputs from other systems. Cognitive-Complex: Tasks requiring complex cognitive involvement (requiring constant attention, frequent interpretation of outside stimuli to inform real-time situations) in conjunction with inputs from other systems. Communication: Tasks requiring primarily communication, via hearing and speaking. Interpersonal Skills: Tasks requiring interpersonal, social interaction between crew including complex technical tasks that require extended crew interaction. Vision: Tasks in which visual information is required. Hearing: Tasks in which primarily auditory information is required, excluding communication, e.g. hearing alarms, medical auscultation, OOHAs. Cardiopulmonary: Tasks requiring greater-than-baseline cardiopulmonary effort, e.g. physically strenuous activities. Dentition: Tasks requiring use of teeth for mastication. GI (Gastrointestinal): Tasks requring use of the alimentary sytem, e.g. solids/liquids consumption and solids excretion. GU (Genitourinary): Tasks requiring use of the male/female genitourinary systems. Hand (Dominant): Tasks performed using primarily the hand, requiring use of the dominant hand (piloting, medical procedures, dental procedures). Hand (Any): Tasks performed using primarily the hand(s), with no preference for dominance, with equivalent bilateral effectiveness. Upper Extremity: Tasks requiring specific use of the upper extremities, excluding hands. Lower Extremity: Tasks requiring specific use of the lower extremities (excluding ambulation and standing in the presence of gravity), e.g. using exercise equipment. Ambulation and Standing (g): Tasks requiring use of both lower extremities to accomplish ambulation or standing in the presence of gravity. Translation and Stabilization (microgravity): Tasks requiring use of either the upper or lower extremities to accomplish translational movement and stabilization (securing oneself to remain stationary) in the setting of microgravity. Don/Doff Equipment: Tasks requiring the donning of personal equipment (including pressure suit, exercise harness, EVA equipment, etc). Pressure Ops: EVA/contingency tasks performed while pressurized in a suit.

Criteria for Assignment of Conditions to HSTCs (any of the following):

1) Is affected crew member physically incapable of performing the human system task category, without impairment, with the condition?
2) Would the treatment (e.g. medications) impair the crewmember's ability to perform the human system task category? (Does not apply to UTx)
3) Does the condition have a high likelihood of causing a significant aeromedical contraindication with an associated human system task category
4) Would performing tasks in an associated task category worsen the condition? (If so, it is affected).
5) Does pain associated with the condition impair any further human system categories?

TASK IMPAIRMENT COMMENTS

No comments.

EVIDENCE COLLECTION PROCESS

Mesh terms that most closely resembled the best-case and worst-case scenarios, and associated Conditions Included but Not Explicitly Stated (CNES), were utilized to build incidence, duration, RTDC, and LOCL searches by best- and worst-case.

Incidence:
Databases searched for spaceflight and analog incidence data included: PubMed, Google Scholar, NASA Technical Reports Server (NTRS) public search, Defense Technical Information Center (DTIC), and Barratt MR, Baker E, Pool SL. Principles of Clinical Medicine for Space Flight. New York, NY: Springer; 2019. 2nd Edition. Databases searched for terrestrial incidence included: DynaMed, PubMed, and Google Scholar.

Duration, RTDC, LOCL:
Databases searched for duration, RTDC, and LOCL included: Dynamed, Cochrane, PubMed, and Google Scholar. Note, that if duration, RTDC, or LOCL data was found in a DynaMed search, the other search engines were not included. Relevant articles were selected and reviewed. If applicable, the article was included in the CLiFF.

LEVEL OF CONFIDENCE (LOC) SCORING

Articles obtained to update the evidence behind this CLiFF were scored by ExMC editors, based on their applicability to the Exploration Spaceflight environment using the following grading scale:

4 – Confident
3 – Somewhat confident
2 – Neutral
1 – Somewhat unconfident
0 – Not confident

The following considerations factor into the grading scale above:

• How closely does the paper describe the medical condition as defined by the IMPACT 1.0 Condiltion List (relevance)?
• How closely does the population included resemble the astronaut population?
• Quality of the paper (number of subjects, methods, etc.)
• How much does the editor trust the source of the evidence?
• How closely does the editor think that the data represents the exploration spaceflight environment?
• Other considerations, at the discretion of the editor, supported in the comments for LOE scoring.

REFERENCES

Reference
1. Health H. Finger Dislocation [cited 2021 4/28/2021]. Available from: https://www.health.harvard.edu/a_to_z/finger-dislocation-a-to-z.
2. Scheuring RA, Mathers CH, Jones J, Wear ML. Musculoskeletal injuries and minor trauma in space: incidence and injury mechanisms in U.S. astronauts. Aviat Space Environ Med. 2009;80(2):117-24.
3. Collins M. Liftoff: The Story of America's Adventure in Space: Grove Press; 1988.
4. Human Research Program, NASA. Finger dislocation. https://humanresearchroadmap.nasa.gov/Evidence/medicalConditions/Finger_Dislocation.pdf. Last updated 12 Aug 2014. Accessed April 28, 2021.
5. Hordinsky J. Skylab Crew Health Crew Surgeons' Reports. In: Johnston RS, Dietlein LF, editors. Biomedical results from Skylab.Washington
D.C.: Library of Congress Cataloging in Publication Data. 1977.
6. Hindle P, Davidson EK, Biant LC, Court-Brown CM. Appendicular joint dislocations. Injury. 2013;44(8):1022-7.
7. Golan E, Kang KK, Culbertson M, Choueka J. The epidemiology of finger dislocations presenting for emergency care within the United States. Hand. 201;11(2):192-6.
8. Yang NP, Chen HC, Phan DV, Yu IL, Lee YH, Chan CL, et al. Epidemiological survey of orthopedic joint dislocations based on nationwide insurance data in Taiwan, 2000-2005. BMC Musculoskelet Disord. 2011;12:253. Epub 2011/11/08. doi: 10.1186/1471-2474-12-253. PubMed PMID: 22053727; PubMed Central PMCID: PMCPMC3228707.
9. Miller EA, Friedrich JB. Management of Finger Joint Dislocation and Fracture-Dislocations in Athletes. Clinics in sports medicine. 2020;39(2):423-42.
10. Saitta BH, Wolf JM. Treating proximal interphalangeal joint dislocations. Hand clinics. 2018;34(2):139-48.
11. Leggit J, Meko CJ. Acute finger injuries: part II. Fractures, dislocations, and thumb injuries. American family physician. 2006;73(5):827-12. Borchers JR, Best TM. Common Finger Fractures and Dislocations. AFP 2012; 85:805–10.
13. Digit dislocation reduction - UpToDate. Retrieved 19 December 2020 from https://www-uptodate-com.libux.utmb.edu/contents/digit-dislocation-reduction?search=finger%20dislocation&source=search_result&selectedTitle=1~2&usage_type=default&display_rank=1

ACRONYMS

ACRONYM	PHRASE
AAOMS	American Association of Oral and Maxillofacial Surgeons
AMA	American Medical Association
ARCL	All Remaining Conditions List
ARS	Acute Radiation Sickness
BHP	Behavioral Health and Performance
CAC	Coronary Artery Calcium
CHS	Crew Health and Safety
CL	Condition List
CliFF	Clinical Finding Form
CMO	Crew Medical Officer
COMFORT	Clinical Outcome Metrics for Optimization of Robust Training
CP1	Clinical Phase 1
CP2	Clinical Phase 2
CP3	Clinical Phase 3
CRL	Clinical Resource Level

CRT	Capability Resource Table
CST	Clinical Science Team
DCS	Decompression Syndrome
DRM	Design Reference Mission
ED	Emergency Medicine Doctor
EL	Evidence Library
EMCL	Exploration Medical Condition List
EMT	Emergency Medical Technician
EVA	Extravehicular Activity
EXMC	Exploration Medical Capability
HRP	Human Research Program
ICD	International Classification of Disease
ICL 1.0	IMPACT 1.0 Medical Conditions List
ICU	Intensive Care Unit
IMCL	iMED Condition List
iMED	Integrated Medical Evidence Database
IMM	Integrated Medical Model
IMPACT-MD	Impact Medical Database
IP	Incidence Proportion
IR	Incidence Rate
ISS	International Space Station
IV	Intravenous
JSC	Johnson Space Center
LEO	Low-Earth orbit
LEVA	Lunar Extravehicular Activity
LOCL	Loss of Crew Life
LOM	Loss of Mission
LSAH	Lifetime Surveillance of Astronaut Health
LSO	Lunar Surface Operations
MCL	Master Condition List
MEVA	Medical Extravehicular Activity
NASA	National Aeronautics and Space Administration
N/A	Not Applicable
NP	Nurse Practitioner
OBGYN	Obstetrics and Gynecology
OR	Occurrence Rate
PA	Physician Assistant
PDQ	Pain Disability Questionnaire
PFCL	Proposed Future Conditions List
PPE	Personal Protective Equipment
PTRS	Project Technical Requirements Specification
PRL	Pharmaceutical Resource Level
QTL	Quality Time Lost

RCL	Removed Conditions List
REP	Rochester Epidemiology Study
RTDC	Removal to Definitive Care
SANS	Spaceflight-Associated Neuro-ocular Syndrome
SAS	Space Adaptation Syndrome
SEVA	Spaceflight Extravehicular Activity
SME	Subject Matter Expert
SoP	Standard Operating Procedure
SPE	Solar Particle Event
TBD	To Be Determined
TI	Task Impairment