Surgical site infection following surgery for hand trauma
A systematic review and meta-analysis

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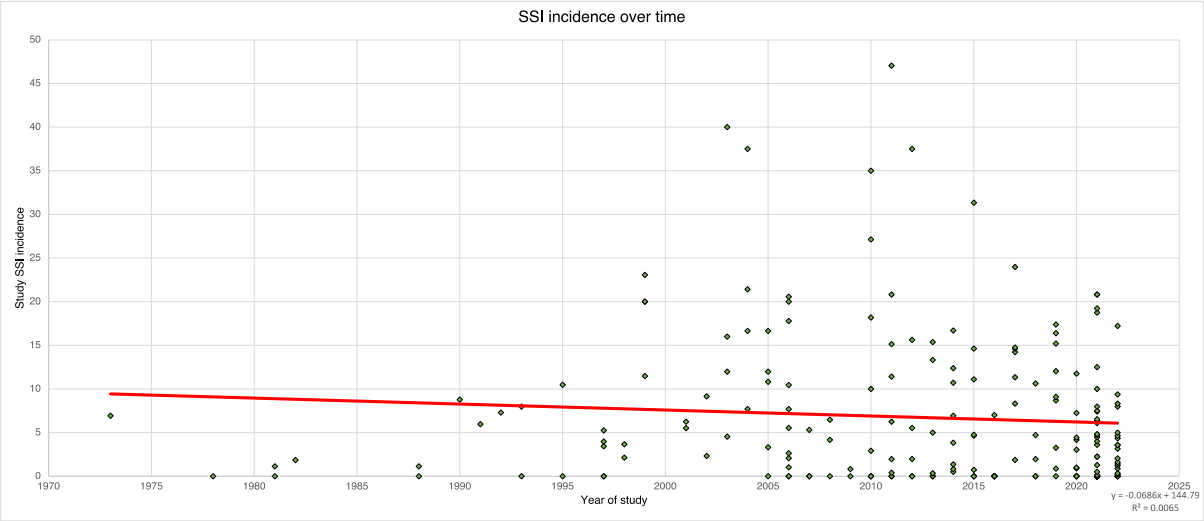
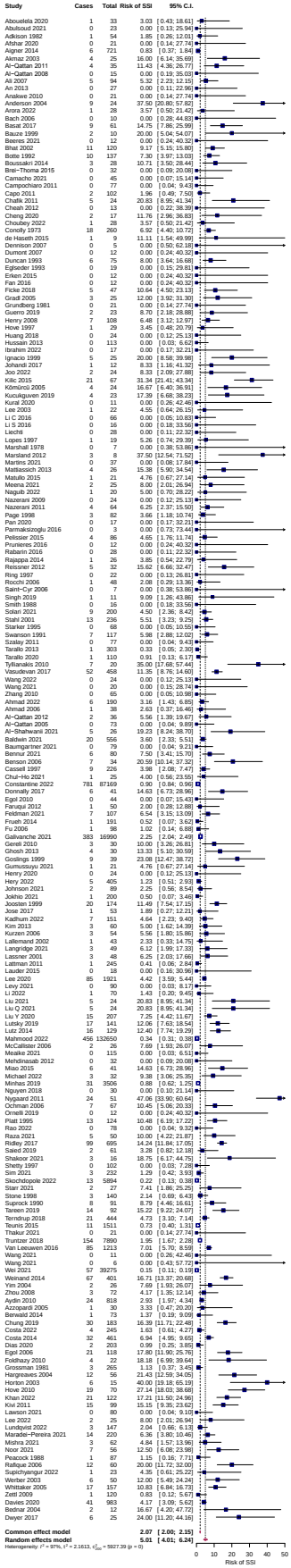
Contents

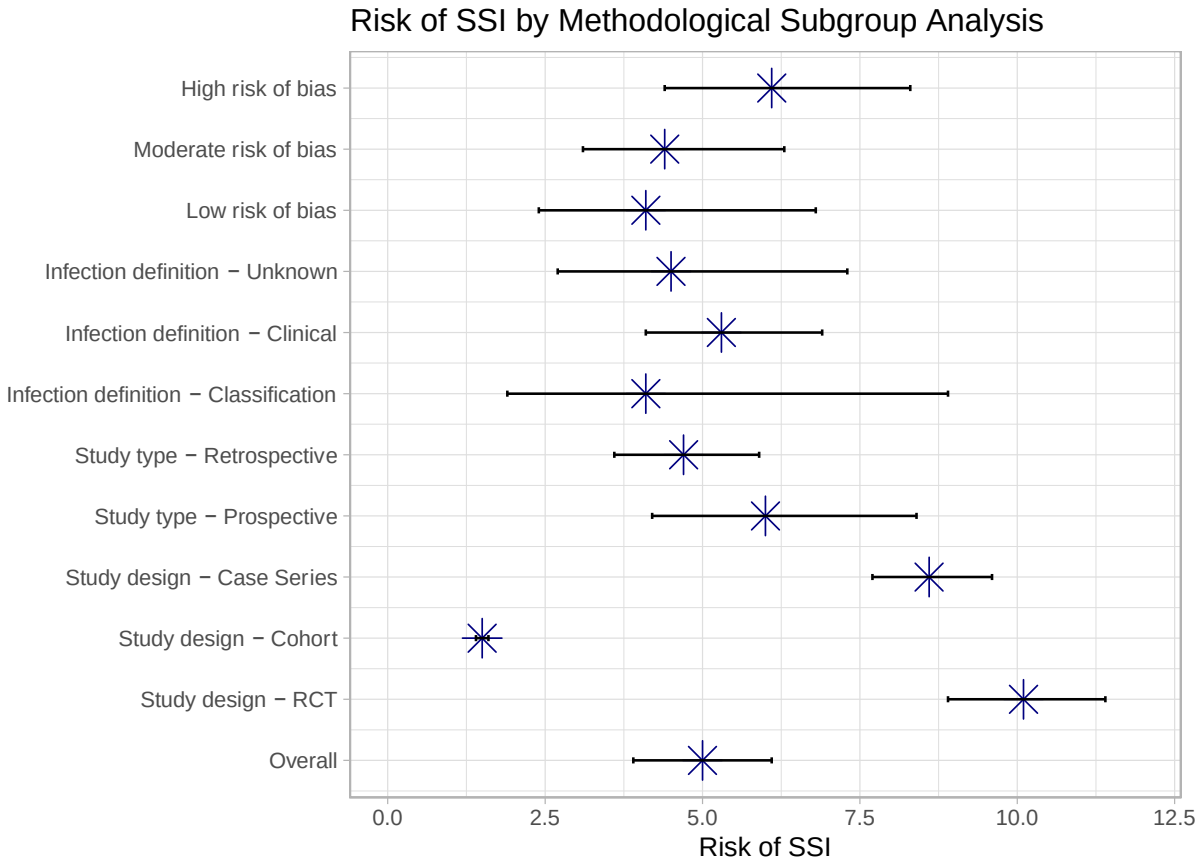
Supplementary figure 1. SSI incidence over time



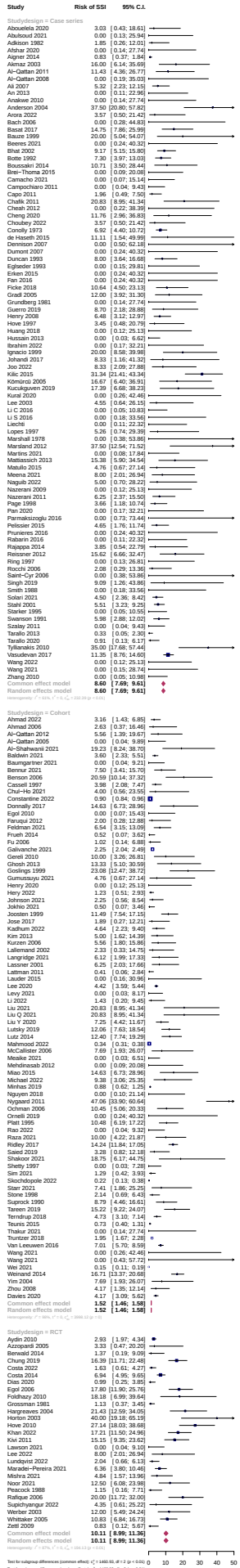
Supplementary Figure 2. Meta-analysis – all included studies



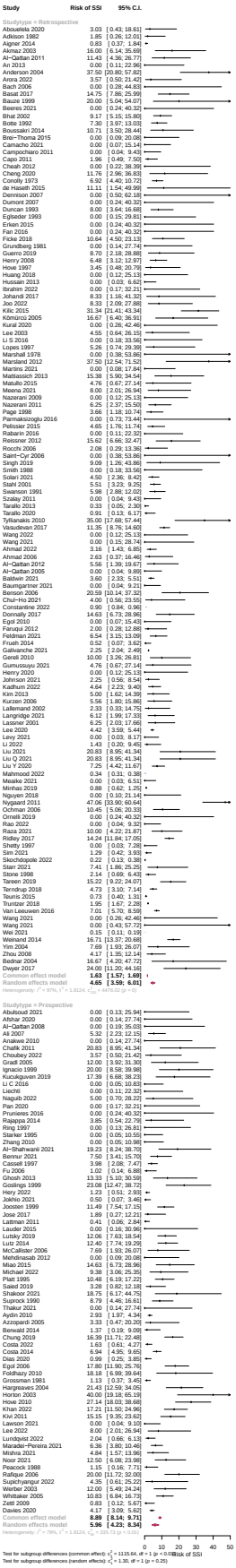
Supplementary Figure 3. Meta-analysis – methodological subgroup analyses



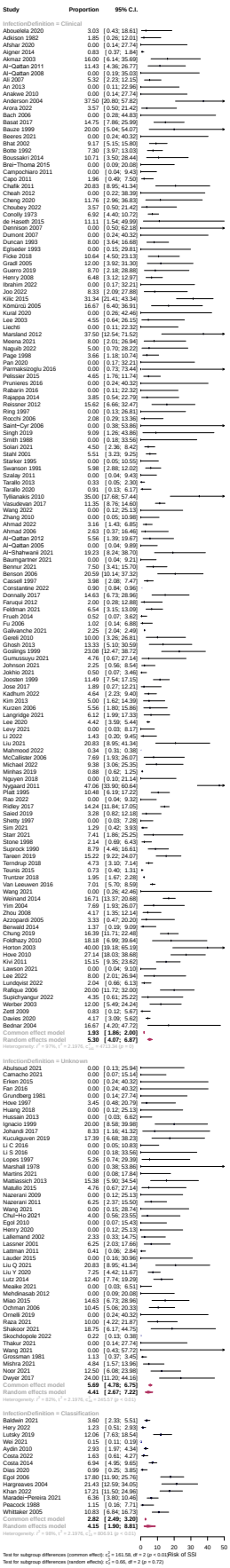
Supplementary Figure 4. Meta-analysis – subgroup analysis by study design



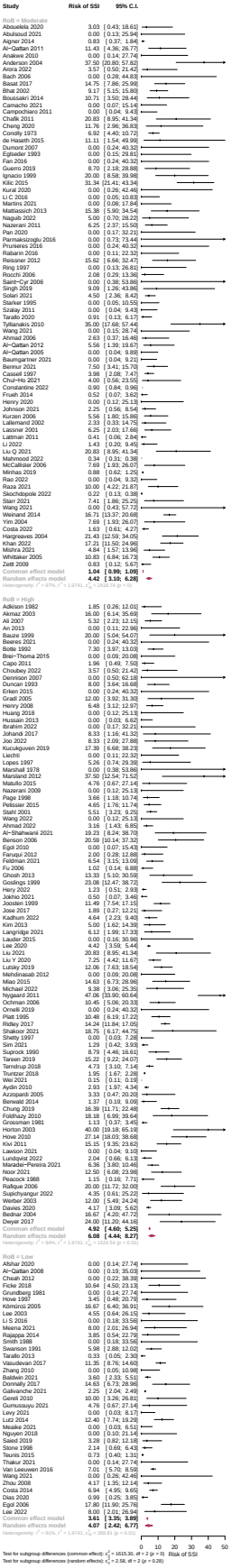
Supplementary Figure 5. Meta-analysis – subgroup analysis by study type



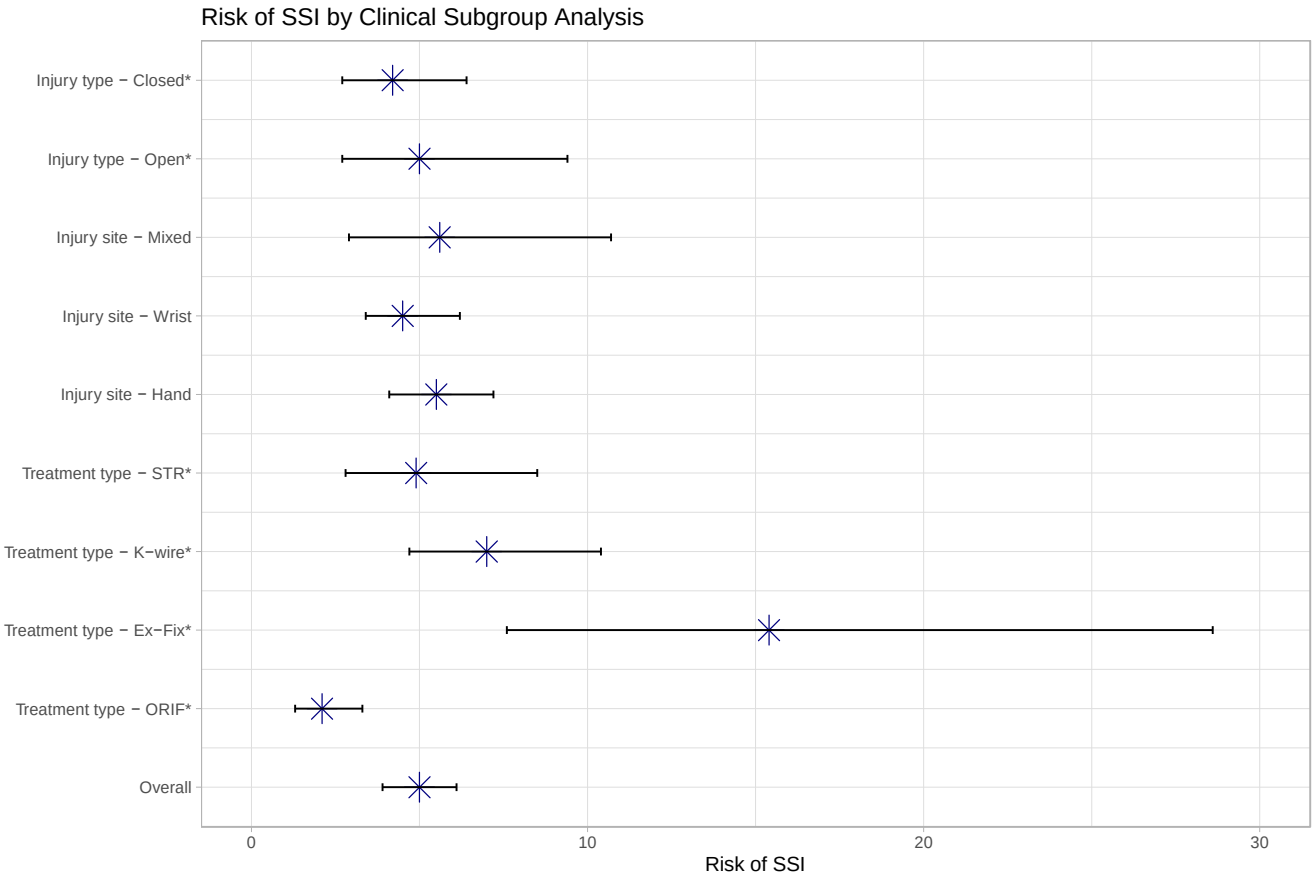
Supplementary Figure 6. Meta-analysis – subgroup analysis by infection definition



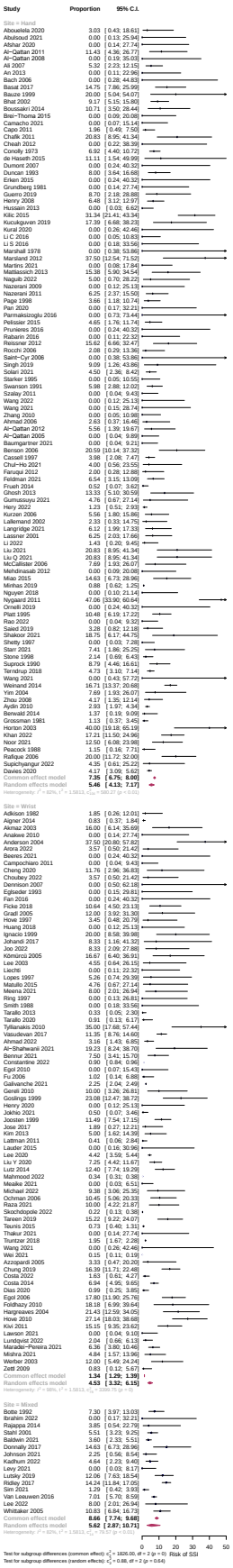
Supplementary Figure 7. Meta-analysis – subgroup analysis by risk of bias



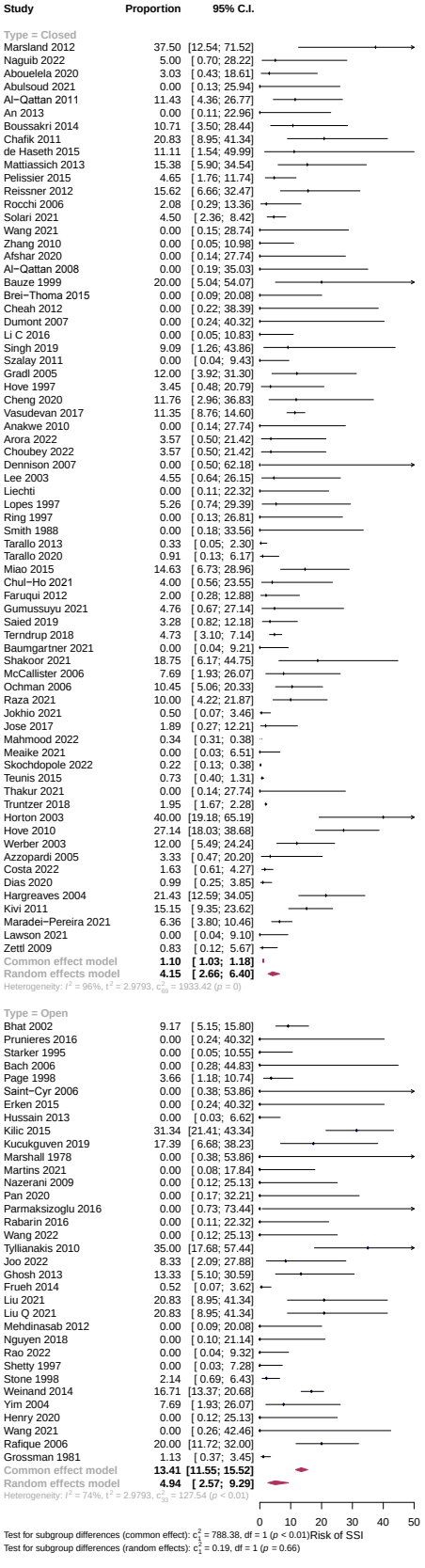
Supplementary Figure 8. Meta-analysis – clinical subgroup analyses



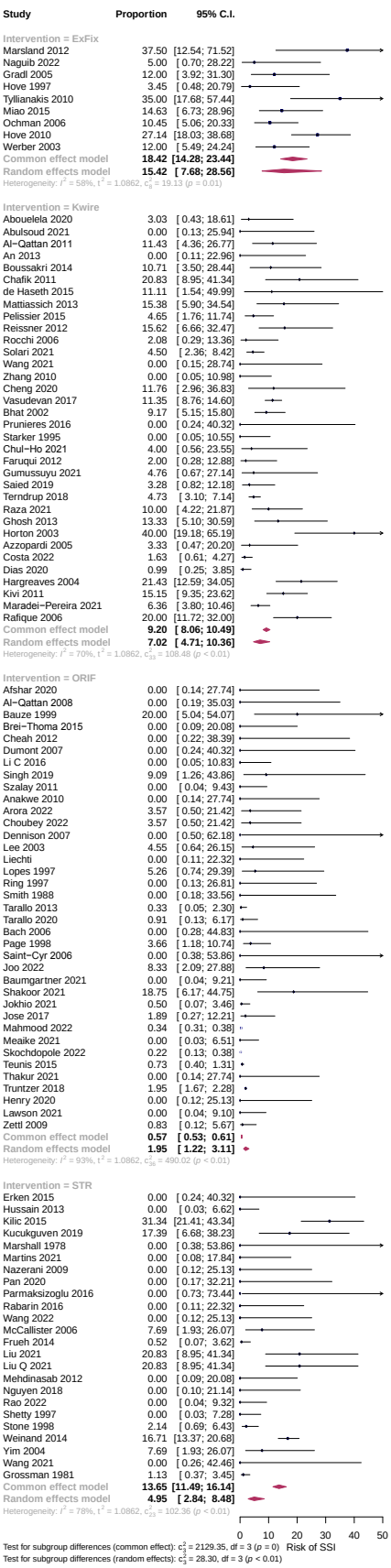
Supplementary Figure 9. Meta-analysis – subgroup analysis by injury site



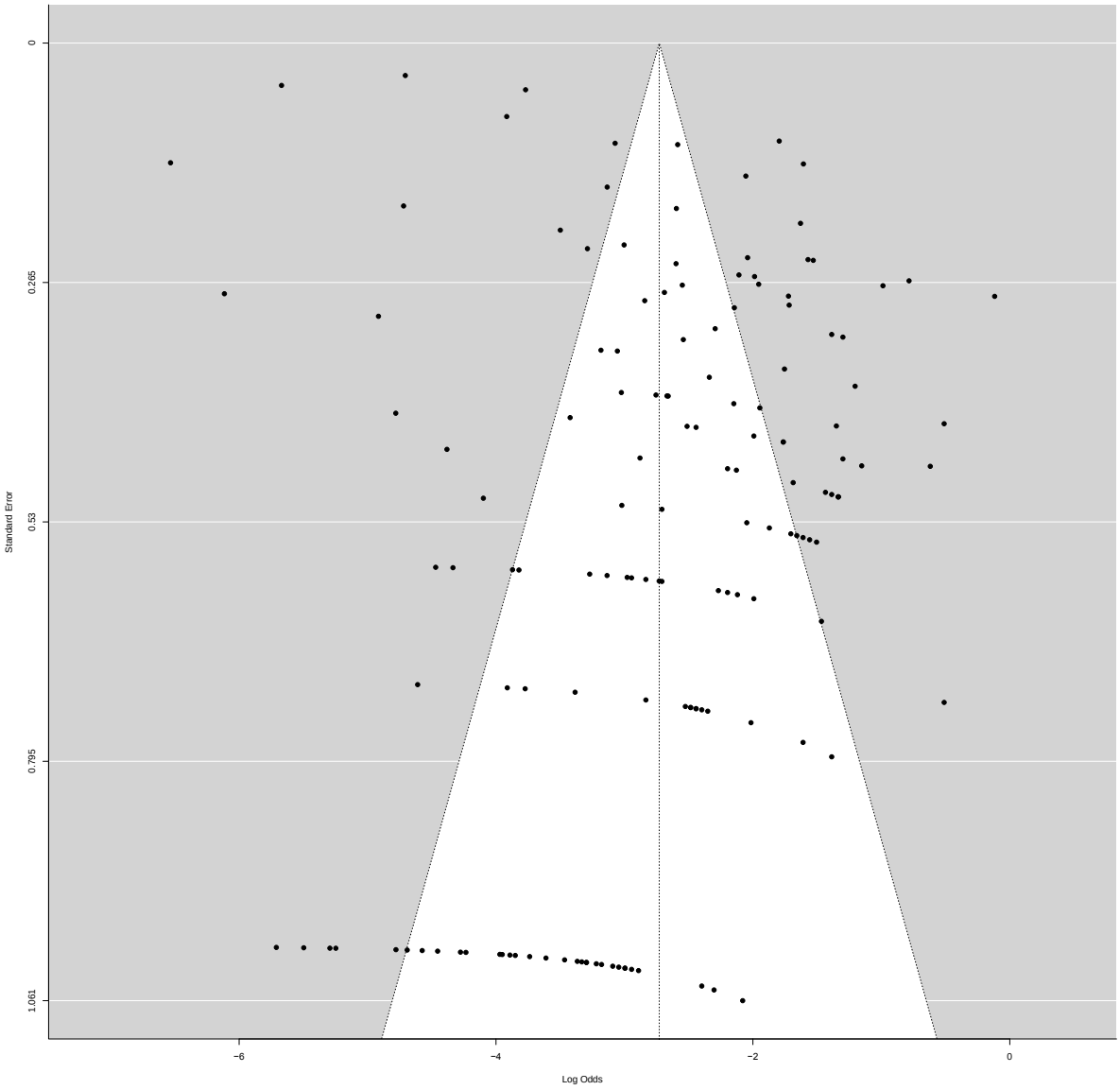
Supplementary Figure 10. Meta-analysis – subgroup analysis by injury type



Supplementary Figure 11. Meta-analysis – subgroup analysis by intervention



Supplementary Figure 12. Meta-analysis – funnel plot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−2
0
Log Odds

Supplementary File 1 - Search Strategies

Search Name: Hand trauma SSI
Date Run: 16/08/2021 14:21:06
Comment:

ID	Search	Hits
#1	hand	36217
#2	trauma	20149
#3	injury	53872
#4	infection	98211
#5	#2 OR #3	66688
#6	#1 and #5	3624
#7	#4 and #6	857

Strategy 1063692/285

See full search strategy

#	Database	Search term	Results
285	CINAHL	(infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))	490

Contents 50 of 490 results on CINAHL - (infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))

Strategy 977736/60

See full search strategy

#	Database	Search term	Results
60	Medline	((exp "METACARPAL BONES"/ OR exp "FINGER PHALANGES"/ OR exp "CARPAL BONES"/ OR exp "HAND BONES"/ OR exp METACARPUS/ OR exp FINGERS/ OR exp HAND/ OR exp "METACARPOPHALANGEAL JOINT"/ OR exp "FINGER JOINT"/ OR exp "CARPOMETACARPAL JOINTS"/ OR exp "CARPAL JOINTS"/ OR exp "HAND JOINTS"/ OR exp WRIST/ OR exp "WRIST JOINT"/) AND (exp "FINGER INJURIES"/ OR exp "HAND INJURIES"/ OR exp "WRIST INJURIES"/ OR exp "ACCIDENTAL INJURIES"/ OR exp "WOUNDS AND INJURIES"/ OR exp "WOUNDS, PENETRATING"/ OR exp "WOUNDS, NONPENETRATING"/ OR exp "VASCULAR SYSTEM INJURIES"/ OR exp "TRAUMA, NERVOUS SYSTEM"/ OR exp "TENDON INJURIES"/ OR exp "SURGICAL WOUND"/ OR exp "SOFT TISSUE INJURIES"/ OR exp REINJURIES/ OR exp "MULTIPLE TRAUMA"/ OR exp LACERATIONS/ OR exp "JOINT DISLOCATIONS"/ OR exp "HAND INJURIES"/ OR exp "FRACTURES, CARTILAGE"/ OR exp "FRACTURES, BONE"/ OR exp "FOREIGN BODIES"/ OR exp "CRUSH INJURIES"/ OR exp "ATHLETIC INJURIES"/ OR exp "ARM INJURIES"/ OR exp "AMPUTATION, TRAUMATIC"/)) AND (exp "GRAM-POSITIVE BACTERIAL INFECTIONS"/ OR exp "GRAM-NEGATIVE BACTERIAL INFECTIONS"/ OR exp "BACTERIAL INFECTIONS"/ OR exp "STAPHYLOCOCCAL INFECTIONS"/ OR exp INFECTIONS/ OR exp "WOUND INFECTION"/ OR exp TOXEMIA/ OR exp "SOFT TISSUE INFECTIONS"/ OR exp "SKIN DISEASES, INFECTIOUS"/ OR exp SEPSIS/ OR exp "BONE DISEASES, INFECTIOUS"/ OR exp "BACTERIAL INFECTIONS AND MYCOSES"/ OR exp "ARTHRITIS, INFECTIOUS"/)	1061

Contents 50 of 1061 results on Medline - ((exp "METACARPAL BONES"/ OR exp "FINGER PHALANGES"/ OR exp "CARPAL BONES"/ OR exp "HAND BONES"/ OR exp METACARPUS/ OR exp FINGERS/ OR exp HAND/ OR exp "METACARPOPHALANGEAL JOINT"/ OR exp "FINGER JOINT"/ OR exp "CARPOMETACARPAL JOINTS"/ OR exp "CARPAL JOINTS"/ OR exp "HAND JOINTS"/ OR exp WRIST/ OR exp "WRIST JOINT"/) AND (exp "FINGER INJURIES"/ OR exp "HAND INJURIES"/ OR exp "WRIST INJURIES"/ OR exp "ACCIDENTAL INJURIES"/ OR exp "WOUNDS AND INJURIES"/ OR exp "WOUNDS, PENETRATING"/ OR exp "WOUNDS, NONPENETRATING"/ OR exp "VASCULAR SYSTEM INJURIES"/ OR exp "TRAUMA, NERVOUS SYSTEM"/ OR exp "TENDON INJURIES"/ OR exp "SURGICAL WOUND"/ OR exp "SOFT TISSUE INJURIES"/ OR exp REINJURIES/ OR exp "MULTIPLE TRAUMA"/ OR exp LACERATIONS/ OR exp "JOINT DISLOCATIONS"/ OR exp "HAND INJURIES"/ OR exp "FRACTURES, CARTILAGE"/ OR exp "FRACTURES, BONE"/ OR exp "FOREIGN BODIES"/ OR exp "CRUSH INJURIES"/ OR exp "ATHLETIC INJURIES"/ OR exp "ARM INJURIES"/ OR exp "AMPUTATION, TRAUMATIC"/)) AND (exp "GRAM-POSITIVE BACTERIAL INFECTIONS"/ OR exp "GRAM-NEGATIVE BACTERIAL INFECTIONS"/ OR exp

Strategy 974100/49

See full search strategy

#	Database	Search term	Results
49	EMBASE	((exp HAND/ OR exp WRIST/ OR exp FINGER/ OR exp THUMB/) AND (exp "ACCIDENTAL INJURY"/ OR exp "BATTLE INJURY"/ OR exp "BLOOD VESSEL INJURY"/ OR exp "BLUNT TRAUMA"/ OR exp "CRUSH TRAUMA"/ OR exp "LIMB INJURY"/ OR exp "NERVOUS SYSTEM INJURY"/ OR exp "MUSCULOSKELETAL INJURY"/ OR exp "SKIN INJURY"/ OR exp "SOFT TISSUE INJURY"/ OR exp "SPORT INJURY"/ OR exp "SURGICAL INJURY"/ OR exp "TISSUE INJURY"/ OR exp "TRAUMATIC AMPUTATION"/ OR exp WOUND/ OR exp INJURY/)) AND (exp "INFECTION BURDEN"/ OR exp SUPPURATION/ OR exp "SOFT TISSUE INFECTION"/ OR exp "SKIN INFECTION"/ OR exp SEPSIS/ OR exp PUS/ OR exp "PRIMARY INFECTION"/ OR exp "PERSISTENT INFECTION"/ OR exp "MUSCULOSKELETAL INFECTION"/ OR exp "INFECTIONS ASSOCIATED WITH OTHER INFECTIONS OR CONDITIONS"/ OR exp "INFECTION RATE"/ OR exp "INFECTION COMPLICATION"/ OR exp "HOSPITAL INFECTION"/ OR exp "HEALTHCARE ASSOCIATED INFECTION"/ OR exp "HAND INFECTION"/ OR exp "GRAFT INFECTION"/ OR exp "DEVICE INFECTION"/ OR exp "BACTERIAL INFECTION"/ OR exp ABSCESS/ OR exp INFECTION/)	2551

Contents 50 of 2551 results on EMBASE - ((exp HAND/ OR exp WRIST/ OR exp FINGER/ OR exp THUMB/) AND (exp "ACCIDENTAL INJURY"/ OR exp "BATTLE INJURY"/ OR exp "BLOOD VESSEL INJURY"/ OR exp "BLUNT TRAUMA"/ OR exp "CRUSH TRAUMA"/ OR exp "LIMB INJURY"/ OR exp "NERVOUS SYSTEM INJURY"/ OR exp "MUSCULOSKELETAL INJURY"/ OR exp "SKIN INJURY"/ OR exp "SOFT TISSUE INJURY"/ OR exp "SPORT INJURY"/ OR exp "SURGICAL INJURY"/ OR exp "TISSUE INJURY"/ OR exp "TRAUMATIC AMPUTATION"/ OR exp WOUND/ OR exp INJURY/)) AND (exp "INFECTION BURDEN"/ OR exp SUPPURATION/ OR exp "SOFT TISSUE INFECTION"/ OR exp "SKIN INFECTION"/ OR exp SEPSIS/ OR exp PUS/ OR exp "PRIMARY INFECTION"/ OR exp "PERSISTENT INFECTION"/ OR exp "MUSCULOSKELETAL INFECTION"/ OR exp "INFECTIONS ASSOCIATED WITH OTHER INFECTIONS OR CONDITIONS"/ OR exp "INFECTION RATE"/ OR exp "INFECTION COMPLICATION"/ OR exp "HOSPITAL INFECTION"/ OR exp "HEALTHCARE ASSOCIATED INFECTION"/ OR exp "HAND INFECTION"/ OR exp "GRAFT INFECTION"/ OR exp "DEVICE INFECTION"/ OR exp "BACTERIAL INFECTION"/ OR exp ABSCESS/ OR exp INFECTION/)

Strategy 970556/81

See full search strategy

#	Database	Search term	Results
81	EMBASE	(infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))	3367

Contents 50 of 3367 results on EMBASE - (infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))

Strategy 970556/242

See full search strategy

#	Database	Search term	Results
242	Medline	(infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))	2014

Contents 50 of 2014 results on Medline - (infect*).ti,ab AND (((((hand*).ti,ab OR (finger*).ti,ab OR (thumb*).ti,ab OR (wrist*).ti,ab OR (phalang*).ti,ab OR (metacarpal*).ti,ab OR (carpal*).ti,ab OR (radius*).ti,ab OR (ulna*).ti,ab) AND ((nerve*).ti,ab OR (neuro*).ti,ab OR (vasc*).ti,ab OR (arter*).ti,ab OR (vessel*).ti,ab OR (tendon*).ti,ab OR (ligament*).ti,ab OR (joint*).ti,ab OR (capsul*).ti,ab OR (volar*).ti,ab OR (musc*).ti,ab)) AND ((trauma*).ti,ab OR (injur*).ti,ab OR (lacerat*).ti,ab OR (fracture*).ti,ab OR (crush*).ti,ab OR (wound*).ti,ab)) AND ((surg*).ti,ab OR (operati*).ti,ab OR (intervent*).ti,ab OR (procedur*).ti,ab OR (repair*).ti,ab OR (fix*).ti,ab OR (reconstruct*).ti,ab OR (debride*).ti,ab OR (closur*).ti,ab OR (dressing*).ti,ab))

Supplementary File 2 - Abstract Decision Tree

Step	Criteria	Decision
1	Is it a primary clinical study of human participants?	Yes – move to step 2 No – exclude
2	Is it a study of surgery for acute hand or wrist injuries? Acute defined as surgery within 4 weeks of injury	Yes – move to step 3 No - exclude
3	Does the study report infection as an outcome?	Yes – move to step 4 No – exclude
4	Confirm that the study reports infection following surgery for acute hand/wrist injury	Yes – include, extract data No – revisit 1-3
5	Extract the following data: • Author • Year • Study design (case series, case control, cohort, RCT) • Study type (retrospective or prospective) • Total study participants • Total surgical participants • Injury site (hand, wrist, mixed) • Injury type (open, closed, mixed) • Treatment type (soft tissue reconstruction, external fixation, K-wire, ORIF, mixed) • Number of infections in surgical participants • Infection diagnosis (classification, clinical, unknown)	

Supplementary File 3. Meta-regression output

```
#Meta-regression

metareg.moderator=rma(yi, vi, data=ies.logit, mods=~Site)
metareg.moderator=rma(yi, vi, data=ies.logit, mods=~RoB)
metareg.moderator=rma(yi, vi, data=ies.logit, mods=~Intervention)
metareg.moderator=rma(yi, vi, data=ies.logit, mods=~Studytype)
metareg.moderator=rma(yi, vi, data=ies.logit, mods=~Studydesign)
metareg.moderator=rma(yi, vi, data=ies.logit, mods=~InfectionDefinition)

metareg.moderators=rma(yi, vi, data=ies.logit,

mods=~Site+Type+Intervention+RoB+Studytype+InfectionDefinition+Studydesign)

metareg.moderators$beta <- exp(metareg.moderators$beta)
metareg.moderators$ci.ub <- exp(metareg.moderators$ci.ub)
metareg.moderators$ci.lb <- exp(metareg.moderators$ci.lb)
print(metareg.moderators) #oddsratios

### Multivariate meta-regression (no test for colinearity) ###

# Mixed-Effects Model (k = 146; tau^2 estimator: REML)

# tau^2 (estimated amount of residual heterogeneity):     0.9027 (SE = 0.1489)
# tau (square root of estimated tau^2 value):             0.9501
# I^2 (residual heterogeneity / unaccounted variability): 89.49%
# H^2 (unaccounted variability / sampling variability):   9.51
# R^2 (amount of heterogeneity accounted for):            28.19%
#
# Test for Residual Heterogeneity:
#   QE(df = 129) = 1289.4455, p-val < .0001

# Test of Moderators (coefficients 2:17):
#   QM(df = 16) = 55.7220, p-val < .0001

# Model Results:

#                       OR      se      zval    pval    ci.lb   ci.ub
# intrcpt               0.4016  0.9812  -0.9297  0.3525  0.0587  2.7479
# SiteMixed             0.8499  0.3549  -0.4582  0.6468  0.4240  1.7039
# SiteWrist             0.6754  0.2434  -1.6126  0.1068  0.4192  1.0882
# TypeMixed             1.3707  0.2493   1.2651  0.2058  0.8410  2.2341
# TypeOpen              1.4903  0.2919   1.3666  0.1717  0.8410  2.6409
# InterventionKwire     0.5709  0.3654  -1.5341  0.1250  0.2789  1.1684
# InterventionMixed     0.3172  0.3345  -3.4327  0.0006  0.1647  0.6110  ***
# InterventionORIF      0.1942  0.3504  -4.6767  <.0001  0.0977  0.3860  ***
# InterventionSTR       0.3481  0.4377  -2.4105  0.0159  0.1476  0.8210   *
# RoBLow                0.9715  0.2770  -0.1045  0.9167  0.5645  1.6718
```

```
# RoBModerate                  0.7999  0.2229  -1.0017  0.3165  0.5168  1.2381
# StudytypeRetrospective       0.8312  0.2583  -0.7157  0.4742  0.5010  1.3790
# InfectionDefinitionClinical  2.1890  0.3647   2.1481  0.0317  1.0710  4.4741    *
# InfectionDefinitionUnknown   2.2493  0.4276   1.8958  0.0580  0.9729  5.1999    .
# StudydesignCase series       0.3059  0.8657  -1.3685  0.1712  0.0561  1.6687
# StudydesignCohort            0.1870  0.8579  -1.9546  0.0506  0.0348  1.0046    .
# StudydesignRCT               0.3385  0.9044  -1.1978  0.2310  0.0575  1.9923

---
#  Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

###


vif(metareg.moderators) #colinearity

#  SiteMixed  SiteWrist  TypeMixed  TypeOpen  InterventionKwire
InterventionMixed  InterventionORIF  InterventionSTR  RoBLow  RoBModerate
StudytypeRetrospective  InfectionDefinitionClinical  InfectionDefinitionUnknown
StudydesignCase series  StudydesignCohort  StudydesignRCT
#  1.3480    1.7483    1.5671   1.9617          2.9807          2.8728          2.0623
2.6545  1.2685      1.3417              1.8834                  3.1246
2.8795             19.7996         21.9811       14.7955

### univariate meta-regression for study design (high colinearity) ###

metareg.moderators=rma(yi, vi, data=ies.logit,
                       mods=~Studydesign) #unvariate study design

metareg.moderators$beta <- exp(metareg.moderators$beta)
metareg.moderators$ci.ub <- exp(metareg.moderators$ci.ub)
metareg.moderators$ci.lb <- exp(metareg.moderators$ci.lb)
print(metareg.moderators) #oddsratios

#  Mixed-Effects Model (k = 146; tau^2 estimator: REML)

#  tau^2 (estimated amount of residual heterogeneity):    1.1878 (SE = 0.1767)
#  tau (square root of estimated tau^2 value):            1.0899
#  I^2 (residual heterogeneity / unaccounted variability): 95.48%
#  H^2 (unaccounted variability / sampling variability):   22.12
#  R^2 (amount of heterogeneity accounted for):            5.51%

#  Test for Residual Heterogeneity:
#   QE(df = 142) = 4357.1378, p-val < .0001

#  Test of Moderators (coefficients 2:4):
#    QM(df = 3) = 9.0521, p-val = 0.0286

#  Model Results:
```

```
#                          OR      se      zval    pval    ci.lb   ci.ub
#   intrcpt                0.2582  0.8873  -1.5257  0.1271  0.0454  1.4701
#   StudydesignCase series 0.3396  0.9047  -1.1937  0.2326  0.0577  2.0002
#   StudydesignCohort      0.1929  0.8997  -1.8292  0.0674  0.0331  1.1248  .
#   StudydesignRCT         0.3039  0.9186  -1.2966  0.1948  0.0502  1.8392

#    Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

### multivariate meta-regression for all other variables (low colinearity) ###

metareg.moderators=rma(yi, vi, data=ies.logit,
                       mods=~Site+Type+Intervention+RoB+Studytype+InfectionDefinition)
#multivariate

metareg.moderators$beta <- exp(metareg.moderators$beta)
metareg.moderators$ci.ub <- exp(metareg.moderators$ci.ub)
metareg.moderators$ci.lb <- exp(metareg.moderators$ci.lb)
print(metareg.moderators) #oddsratios

###

# Mixed-Effects Model (k = 146; tau^2 estimator: REML)

# tau^2 (estimated amount of residual heterogeneity):     0.9715 (SE = 0.1561)
# tau (square root of estimated tau^2 value):             0.9857
# I^2 (residual heterogeneity / unaccounted variability): 90.29%
# H^2 (unaccounted variability / sampling variability):   10.30
# R^2 (amount of heterogeneity accounted for):            22.72%

# Test for Residual Heterogeneity:
#   QE(df = 132) = 1563.5878, p-val < .0001

# Test of Moderators (coefficients 2:14):
#   QM(df = 13) = 42.9688, p-val < .0001

# Model Results:

#                          OR      se      zval    pval    ci.lb   ci.ub
# intrcpt                  0.1352  0.5112  -3.9139  <.0001  0.0497  0.3683  ***
# SiteMixed                0.7943  0.3642  -0.6324  0.5271  0.3890  1.6218
# SiteWrist                0.7080  0.2446  -1.4116  0.1581  0.4383  1.1435
# TypeMixed                1.1549  0.2477   0.5815  0.5609  0.7108  1.8765
# TypeOpen                 1.2735  0.2957   0.8176  0.4136  0.7133  2.2736
# InterventionKwire        0.5487  0.3723  -1.6121  0.1069  0.2645  1.1382
# InterventionMixed        0.2844  0.3352  -3.7516  0.0002  0.1474  0.5485  ***
# InterventionORIF         0.1708  0.3552  -4.9757  <.0001  0.0851  0.3426  ***
# InterventionSTR          0.3442  0.4418  -2.4141  0.0158  0.1448  0.8182   *
# RoBLow                   0.9333  0.2834  -0.2437  0.8074  0.5355  1.6264
# RoBModerate              0.7966  0.2257  -1.0074  0.3137  0.5118  1.2398
# StudytypeRetrospective   0.8284  0.2262  -0.8325  0.4051  0.5318  1.2904
```

```
# InfectionDefinitionClinical    1.8715  0.3511   1.7850  0.0743  0.9404  3.7246    .
# InfectionDefinitionUnknown     1.8893  0.4157   1.5305  0.1259  0.8365  4.2670

# Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

permutest(metareg.moderators) #permutation
print(metareg.moderators)

# Mixed-Effects Model (k = 146; tau^2 estimator: REML)

# tau^2 (estimated amount of residual heterogeneity):     0.9715 (SE = 0.1561)
# tau (square root of estimated tau^2 value):             0.9857
# I^2 (residual heterogeneity / unaccounted variability): 90.29%
# H^2 (unaccounted variability / sampling variability):   10.30
# R^2 (amount of heterogeneity accounted for):            22.72%

# Test for Residual Heterogeneity:
# QE(df = 132) = 1563.5878, p-val < .0001

# Test of Moderators (coefficients 2:14):
# QM(df = 13) = 42.9688, p-val < .0001

# Model Results:

#  estimate      se     zval    pval   ci.lb   ci.ub
# intrcpt                  0.1352  0.5112  -3.9139  <.0001  0.0497  0.3683  ***
# SiteMixed                0.7943  0.3642  -0.6324  0.5271  0.3890  1.6218
# SiteWrist                0.7080  0.2446  -1.4116  0.1581  0.4383  1.1435
# TypeMixed                1.1549  0.2477   0.5815  0.5609  0.7108  1.8765
# TypeOpen                 1.2735  0.2957   0.8176  0.4136  0.7133  2.2736
# InterventionKwire        0.5487  0.3723  -1.6121  0.1069  0.2645  1.1382
# InterventionMixed        0.2844  0.3352  -3.7516  0.0002  0.1474  0.5485  ***
# InterventionORIF         0.1708  0.3552  -4.9757  <.0001  0.0851  0.3426  ***
# InterventionSTR          0.3442  0.4418  -2.4141  0.0158  0.1448  0.8182   *
# RoBLow                   0.9333  0.2834  -0.2437  0.8074  0.5355  1.6264
# RoBModerate              0.7966  0.2257  -1.0074  0.3137  0.5118  1.2398
# StudytypeRetrospective   0.8284  0.2262  -0.8325  0.4051  0.5318  1.2904
# InfectionDefinitionClinical    1.8715  0.3511   1.7850  0.0743  0.9404  3.7246    .
# InfectionDefinitionUnknown     1.8893  0.4157   1.5305  0.1259  0.8365  4.2670

# Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1
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Supplementary File 6. References for included studies

Study	Reference	Citation
Abouelela 2020	1	Abouelela A, Mubark I, Hassan M, Howells M, Ashwood N, Kitsis C. Mid-Term Outcomes of Unstable Complex Proximal Interphalangeal Joint Fracture Management Using the Ligamentotaxor® Device: A Case Series of 33 Cases. Cureus. 2020 Sep;12(9):e10519.
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Afshar 2020	4	Afshar A, Tabrizi A, Taleb H, Safari M. Results of fracture-dislocation of interphalangeal treatment with volar buttressing hook plating techniques. Orthop Traumatol Surg Res. 2020 Jun;106(4):765–9.
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Supplementary Table 1 - Characteristics of RCTs

Author Year	Site	Type	Intervention	Study Type	Study Design	Infection Definition	Risk of Bias	SSI	Total
Grossman 1981	Hand	Open	STR	Prospective	RCT	Unknown	Moderate	3	265
Peacock 1988	Hand	Mixed	Mixed	Prospective	RCT	Classification	High	1	87
Horton 2003	Hand	Closed	K-wire	Prospective	RCT	Clinical	High	6	15
Werber 2003	Wrist	Closed	Ex-Fix	Prospective	RCT	Clinical	Moderate	6	50
Hargreaves 2004	Wrist	Closed	K-wire	Prospective	RCT	Classification	High	12	56
Azzopardi 2005	Wrist	Closed	K-wire	Prospective	RCT	Clinical	High	1	30
Whittaker 2005	Mixed	Open	STR	Prospective	RCT	Classification	Moderate	17	157
Egol 2006	Wrist	Mixed	Ex-Fix	Prospective	RCT	Classification	High	21	118
Rafique 2006	Hand	Open	K-wire	Prospective	RCT	Clinical	High	12	60
Zettl 2009	Wrist	Closed	ORIF	Prospective	RCT	Clinical	HIgh	1	120
Aydin 2010	Hand	Mixed	Mixed	Prospective	RCT	Classification	High	24	818
Foldhazy 2010	Wrist	Closed	Mixed	Prospective	RCT	Clinical	High	4	22
Hove 2010	Wrist	Closed	Ex-Fix	Prospective	RCT	Clinical	Moderate	19	70
Kivi 2011	Wrist	Closed	K-wire	Prospective	RCT	Clinical	High	15	99
Berwald 2014	Hand	Open	STR	Prospective	RCT	Clinical	High	1	73
Costa 2014	Wrist	Closed	Mixed	Prospective	RCT	Classification	Low	32	461
Chung 2019	Wrist	Closed	Mixed	Prospective	RCT	Clinical	Moderate	30	183
Dias 2020	Wrist	Closed	K-wire	Prospective	RCT	Classification	Low	2	203
Lawson 2021	Wrist	Closed	ORIF	Prospective	RCT	Clinical	Low	0	80
Maradei-Pereira 2021	Wrist	Closed	K-wire	Prospective	RCT	Classification	Moderate	14	220
Mishra 2021	Wrist	Closed	Mixed	Prospective	RCT	Unknown	High	3	62
Noor 2021	Hand	Closed	Mixed	Prospective	RCT	Unknown	High	7	56
Costa 2022	Wrist	Closed	K-wire	Prospective	RCT	Classification	Low	4	245
Khan 2022	Hand	Mixed	K-wire	Prospective	RCT	Classification	High	21	122
Lee 2022	Mixed	Open	STR	Prospective	RCT	Clinical	High	2	25
Lundqvist 2022	Wrist	Closed	ORIF	Prospective	RCT	Clinical	High	3	147
Supichyangur 2022	Hand	Closed	Mixed	Prospective	RCT	Clinical	High	1	23

STR = soft tissue reconstruction, Ex-Fix = external fixation, ORIF = open reduction internal fixation, RCT = randomised control trial

Supplementary Table 2 - Characteristics of Cohort Studies

Author Year	Site	Type	Intervention	Study Type	Study Design	Infection Definition	Risk of Bias	SSI	Total
Suprock 1990	Hand	Open	Mixed	Prospective	Cohort	Clinical	High	8	91
Platt 1995	Hand	Open	Mixed	Prospective	Cohort	Clinical	Moderate	13	124
Shetty 1997	Hand	Open	STR	Retrospective	Cohort	Clinical	High	0	102
Stone 1998	Hand	Open	STR	Retrospective	Cohort	Clinical	High	3	140
Goslings 1999	Wrist	Mixed	Ex-Fix	Prospective	Cohort	Clinical	Low	9	39
Joosten 1999	Wrist	Mixed	Ex-Fix	Prospective	Cohort	Clinical	High	20	174
Lassner 2001	Hand	Mixed	STR	Retrospective	Cohort	Unknown	Moderate	3	48
Lallemand 2002	Hand	Mixed	ORIF	Retrospective	Cohort	Unknown	High	1	43
Yim 2004	Hand	Open	STR	Retrospective	Cohort	Clinical	Low	2	26
Al-Qattan 2005	Hand	Mixed	STR	Retrospective	Cohort	Clinical	Moderate	0	73
Ahmad 2006	Hand	Mixed	Mixed	Retrospective	Cohort	Clinical	High	1	38
Benson 2006	Hand	Open	Mixed	Retrospective	Cohort	Clinical	Moderate	7	34
Fu 2006	Wrist	Mixed	Ex-Fix	Prospective	Cohort	Clinical	Low	1	98
Kurzen 2006	Hand	Mixed	ORIF	Retrospective	Cohort	Clinical	Moderate	3	54
McCallister 2006	Hand	Closed	STR	Prospective	Cohort	Clinical	Low	2	26
Ochman 2006	Wrist	Closed	Ex-Fix	Retrospective	Cohort	Unknown	High	7	67
Zhou 2008	Hand	Closed	Mixed	Retrospective	Cohort	Clinical	High	3	72
Egol 2010	Wrist	Mixed	Mixed	Retrospective	Cohort	Unknown	High	0	44
Gereli 2010	Wrist	Mixed	Mixed	Retrospective	Cohort	Clinical	High	3	30
Lattman 2011	Wrist	Closed	Mixed	Prospective	Cohort	Unknown	High	1	245
Nygaard 2011	Hand	Mixed	Mixed	Retrospective	Cohort	Clinical	High	24	51
Al-Qattan 2012	Hand	Open	Mixed	Retrospective	Cohort	Clinical	Moderate	2	36
Faruqui 2012	Hand	Closed	K-wire	Retrospective	Cohort	Clinical	High	1	50
Mehdinasab 2012	Hand	Open	STR	Prospective	Cohort	Unknown	High	0	32
Ghosh 2013	Hand	Open	K-wire	Prospective	Cohort	Clinical	High	4	30
Kim 2013	Wrist	Mixed	ORIF	Retrospective	Cohort	Clinical	Moderate	3	60
Frueh 2014	Hand	Open	STR	Retrospective	Cohort	Clinical	High	1	191
Lutz 2014	Wrist	Mixed	K-wire	Prospective	Cohort	Unknown	Moderate	16	129

Weinand 2014	Hand	Open	STR	Retrospective	Cohort	Clinical	Moderate	67	401
Lauder 2015	Wrist	Mixed	ORIF	Prospective	Cohort	Unknown	High	0	18
Miao 2015	Hand	Closed	Ex-Fix	Prospective	Cohort	Unknown	High	6	41
Teunis 2015	Wrist	Closed	ORIF	Retrospective	Cohort	Clinical	Low	11	1511
Van Leeuwen 2016	Mixed	Open	K-wire	Retrospective	Cohort	Clinical	Low	85	1213
Basat 2017	Hand	Open	Mixed	Retrospective	Cohort	Clinical	Moderate	9	61
Donnally 2017	Mixed	Mixed	Mixed	Retrospective	Cohort	Clinical	High	6	41
Jose 2017	Wrist	Closed	ORIF	Prospective	Cohort	Clinical	High	1	53
Ridley 2017	Mixed	Open	K-wire	Retrospective	Cohort	Clinical	Low	99	695
Nguyen 2018	Hand	Open	STR	Retrospective	Cohort	Clinical	High	0	30
Terndrup 2018	Hand	Closed	K-wire	Retrospective	Cohort	Clinical	Low	21	444
Truntzer 2018	Wrist	Closed	ORIF	Retrospective	Cohort	Clinical	Low	154	7890
Lutsky 2019	Mixed	Mixed	K-wire	Prospective	Cohort	Classification	Low	17	141
Minhas 2019	Hand	Mixed	Mixed	Retrospective	Cohort	Clinical	Low	31	3506
Ornelli 2019	Hand	Mixed	STR	Retrospective	Cohort	Unknown	High	0	12
Saied 2019	Hand	Closed	K-wire	Prospective	Cohort	Clinical	High	2	61
Tareen 2019	Wrist	Open	Mixed	Retrospective	Cohort	Clinical	High	14	92
Davies 2020	Hand	Open	Mixed	Prospective	Cohort	Clinical	Low	41	983
Henry 2020	Wrist	Open	ORIF	Retrospective	Cohort	Unknown	High	0	24
Lee 2020	Wrist	Mixed	ORIF	Retrospective	Cohort	Clinical	Low	85	1921
Liu Y 2020	Wrist	Mixed	Ex-Fix	Retrospective	Cohort	Unknown	High	15	207
Al-Shahwanii 2021	Wrist	Closed	Mixed	Prospective	Cohort	Clinical	High	5	26
Baldwin 2021	Mixed	Mixed	Mixed	Retrospective	Cohort	Classification	Low	20	556
Baumgartner 2021	Hand	Closed	ORIF	Retrospective	Cohort	Clinical	Moderate	0	79
Bennur 2021	Wrist	Closed	Mixed	Prospective	Cohort	Clinical	High	6	80
Chul-Ho 2021	Hand	Closed	K-wire	Retrospective	Cohort	Unknown	Moderate	1	25
Feldman 2021	Hand	Mixed	Mixed	Retrospective	Cohort	Clinical	Moderate	7	107
Galivanche 2021	Wrist	Mixed	ORIF	Retrospective	Cohort	Clinical	Low	383	16990
Gumussuyu 2021	Hand	Closed	K-wire	Retrospective	Cohort	Clinical	Moderate	1	21
Johnson 2021	Mixed	Open	Mixed	Retrospective	Cohort	Clinical	High	2	89

STR = soft tissue reconstruction, Ex-Fix = external fixation, ORIF = open reduction internal fixation

Jokhio 2021	Wrist	Closed	ORIF	Prospective	Cohort	Clinical	High	1	200
Langridge 2021	Hand	Closed	Mixed	Retrospective	Cohort	Clinical	Moderate	3	49
Levy 2021	Mixed	Mixed	K-wire	Retrospective	Cohort	Clinical	Moderate	0	90
Liu 2021	Hand	Open	STR	Retrospective	Cohort	Clinical	Moderate	5	24
Liu Q 2021	Hand	Open	STR	Retrospective	Cohort	Unknown	High	5	24
Meaike 2021	Wrist	Closed	ORIF	Retrospective	Cohort	Unknown	High	0	115
Raza 2021	Wrist	Closed	K-wire	Retrospective	Cohort	Unknown	High	5	50
Shakoor 2021	Hand	Closed	ORIF	Prospective	Cohort	Unknown	High	3	16
Sim 2021	Mixed	Open	Mixed	Retrospective	Cohort	Clinical	Moderate	3	232
Starr 2021	Hand	Open	Mixed	Retrospective	Cohort	Clinical	Low	2	27
Thakur 2021	Wrist	Closed	ORIF	Prospective	Cohort	Unknown	High	0	21
Wang 2021	Hand	Mixed	STR	Retrospective	Cohort	Unknown	Moderate	0	6
Wang 2021	Wrist	Open	STR	Retrospective	Cohort	Clinical	High	0	11
Wei 2021	Wrist	Mixed	Mixed	Retrospective	Cohort	Classification	Moderate	57	39275
Ahmad 2022	Wrist	Closed	Mixed	Retrospective	Cohort	Clinical	Moderate	6	190
Constantine 2022	Wrist	Mixed	Mixed	Retrospective	Cohort	Clinical	Moderate	781	87169
Hery 2022	Hand	Open	Mixed	Prospective	Cohort	Classification	Moderate	5	405
Kadhum 2022	Mixed	Open	STR	Retrospective	Cohort	Clinical	High	7	151
Li 2022	Hand	Mixed	Mixed	Retrospective	Cohort	Clinical	High	1	70
Mahmood 2022	Wrist	Closed	ORIF	Retrospective	Cohort	Clinical	Moderate	456	132650
Michael 2022	Wrist	Mixed	Ex-Fix	Prospective	Cohort	Clinical	Moderate	3	32
Rao 2022	Hand	Open	STR	Retrospective	Cohort	Clinical	Moderate	0	78
Skochdopole 2022	Wrist	Closed	ORIF	Retrospective	Cohort	Unknown	Moderate	13	5894

Supplementary Table 3 - Characteristics of Case Control Studies

Author Year	Site	Type	Intervention	Study Type	Study Design	Infection Definition	Risk of Bias	SSI	Total
Bednar 2004	Wrist	Closed	Ex-Fix	Retrospective	Case control	Clinical	High	2	12
Dwyer 2017	Wrist	Closed	Mixed	Retrospective	Case control	Unknown	High	6	25

Ex-Fix = external fixation

Supplementary Table 4 - Characteristics of Case Series

Author Year	Site	Type	Intervention	Study Type	Study Design	Infection Definition	Risk of Bias	SSI	Total
Conolly 1973	Hand	Mixed	Mixed	Retrospective	Case series	Clinical	High	18	260
Marshall 1978	Hand	Open	STR	Retrospective	Case series	Unknown	High	0	7
Grundberg 1981	Hand	Mixed	ORIF	Retrospective	Case series	Unknown	High	0	21
Adkison 1982	Wrist	Mixed	Mixed	Retrospective	Case series	Clinical	High	1	54
Smith 1988	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	0	16
Swanson 1991	Hand	Closed	Mixed	Retrospective	Case series	Clinical	Moderate	7	117
Botte 1992	Mixed	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	10	137
Duncan 1993	Hand	Closed	Mixed	Retrospective	Case series	Clinical	Moderate	6	75
Eglseder 1993	Wrist	Mixed	Ex-Fix	Retrospective	Case series	Clinical	High	0	19
Starker 1995	Hand	Open	K-wire	Prospective	Case series	Clinical	High	0	68
Hove 1997	Wrist	Closed	Ex-Fix	Retrospective	Case series	Unknown	High	1	29
Lopes 1997	Wrist	Closed	ORIF	Retrospective	Case series	Unknown	High	1	19
Ring 1997	Wrist	Closed	ORIF	Prospective	Case series	Clinical	Moderate	0	22
Page 1998	Hand	Open	ORIF	Retrospective	Case series	Clinical	Moderate	3	82
Bauze 1999	Hand	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	2	10
Ignacio 1999	Wrist	Mixed	Ex-Fix	Prospective	Case series	Unknown	High	5	25
Stahl 2001	Mixed	Open	K-wire	Retrospective	Case series	Clinical	Moderate	13	236
Bhat 2002	Hand	Open	K-wire	Retrospective	Case series	Clinical	High	11	120
Akmaz 2003	Wrist	Mixed	Ex-Fix	Retrospective	Case series	Clinical	High	4	25
Lee 2003	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	1	22
Anderson 2004	Wrist	Mixed	Ex-Fix	Retrospective	Case series	Clinical	Moderate	9	24
Gradl 2005	Wrist	Closed	Ex-Fix	Prospective	Case series	Clinical	Low	3	25
Kömürcü 2005	Wrist	Mixed	Ex-Fix	Retrospective	Case series	Clinical	Moderate	4	24
Bach 2006	Hand	Open	ORIF	Retrospective	Case series	Clinical	Moderate	0	10
Rocchi 2006	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	1	48
Saint-Cyr 2006	Hand	Open	ORIF	Retrospective	Case series	Clinical	Moderate	0	7
Ali 2007	Hand	Mixed	Mixed	Prospective	Case series	Clinical	High	5	94
Dennison 2007	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	0	5

Dumont 2007	Hand	Closed	ORIF	Retrospective	Case series	Clinical	High	0	12
Al-Qattan 2008	Hand	Closed	ORIF	Prospective	Case series	Clinical	Moderate	0	15
Henry 2008	Hand	Mixed	STR	Retrospective	Case series	Clinical	Moderate	7	108
Nazerani 2009	Hand	Open	STR	Retrospective	Case series	Unknown	Moderate	0	24
Anakwe 2010	Wrist	Closed	ORIF	Prospective	Case series	Clinical	Moderate	0	21
Tyllianakis 2010	Wrist	Open	Ex-Fix	Retrospective	Case series	Clinical	Moderate	7	20
Zhang 2010	Hand	Closed	K-wire	Prospective	Case series	Clinical	Low	0	65
Al-Qattan 2011	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Low	4	35
Campochiaro 2011	Wrist	Closed	Mixed	Retrospective	Case series	Clinical	Moderate	0	77
Capo 2011	Hand	Open	Mixed	Retrospective	Case series	Clinical	Moderate	2	102
Chafik 2011	Hand	Closed	K-wire	Prospective	Case series	Clinical	High	5	24
Nazerani 2011	Hand	Mixed	STR	Retrospective	Case series	Unknown	High	4	64
Szalay 2011	Hand	Closed	ORIF	Retrospective	Case series	Clinical	Low	0	77
Cheah 2012	Hand	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	0	13
Marsland 2012	Hand	Closed	Ex-Fix	Retrospective	Case series	Clinical	High	3	8
Reissner 2012	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Low	5	32
An 2013	Hand	Closed	K-wire	Retrospective	Case series	Clinical	High	0	27
Hussain 2013	Hand	Open	STR	Retrospective	Case series	Unknown	High	0	113
Mattiassich 2013	Hand	Closed	K-wire	Retrospective	Case series	Unknown	Moderate	4	26
Tarallo 2013	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	1	303
Aigner 2014	Wrist	Mixed	Mixed	Retrospective	Case series	Clinical	Moderate	6	721
Boussakri 2014	Hand	Closed	K-wire	Retrospective	Case series	Clinical	High	3	28
Rajappa 2014	Mixed	Open	STR	Prospective	Case series	Clinical	Moderate	1	26
Brei-Thoma 2015	Hand	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	0	32
de Haseth 2015	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	1	9
Erken 2015	Hand	Open	STR	Retrospective	Case series	Unknown	Moderate	0	12
Kilic 2015	Hand	Open	STR	Retrospective	Case series	Clinical	High	21	67
Matullo 2015	Wrist	Mixed	ORIF	Retrospective	Case series	Unknown	Moderate	1	21
Pelissier 2015	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	4	86
Fan 2016	Wrist	Mixed	ORIF	Retrospective	Case series	Unknown	High	0	12

STR = soft tissue reconstruction, Ex-Fix = external fixation, ORIF = open reduction internal fixation

Li C 2016	Hand	Closed	ORIF	Prospective	Case series	Unknown	Low	0	66
Li S 2016	Hand	Mixed	K-wire	Retrospective	Case series	Unknown	Moderate	0	16
Parmaksizoglu 2016	Hand	Open	STR	Retrospective	Case series	Clinical	Moderate	0	3
Prunieres 2016	Hand	Open	K-wire	Prospective	Case series	Clinical	High	0	12
Rabarin 2016	Hand	Open	STR	Retrospective	Case series	Clinical	Moderate	0	28
Johandi 2017	Wrist	Mixed	STR	Retrospective	Case series	Unknown	Moderate	1	12
Vasudevan 2017	Wrist	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	52	458
Ficke 2018	Wrist	Mixed	ORIF	Retrospective	Case series	Clinical	Moderate	5	47
Huang 2018	Wrist	Mixed	ORIF	Retrospective	Case series	Unknown	Low	0	24
Guerro 2019	Hand	Mixed	ORIF	Retrospective	Case series	Clinical	Low	2	23
Kucukguven 2019	Hand	Open	STR	Prospective	Case series	Unknown	Low	4	23
Singh 2019	Hand	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	1	11
Abouelela 2020	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Moderate	1	33
Afshar 2020	Hand	Closed	ORIF	Prospective	Case series	Clinical	Low	0	21
Cheng 2020	Wrist	Closed	K-wire	Retrospective	Case series	Clinical	Low	2	17
Kural 2020	Hand	Closed	Mixed	Retrospective	Case series	Clinical	High	0	11
Pan 2020	Hand	Open	STR	Prospective	Case series	Clinical	High	0	17
Tarallo 2020	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Low	1	110
Abulsoud 2021	Hand	Closed	K-wire	Prospective	Case series	Unknown	Moderate	0	23
Beeres 2021	Wrist	Mixed	ORIF	Retrospective	Case series	Clinical	High	0	12
Camacho 2021	Hand	Mixed	ORIF	Retrospective	Case series	Unknown	High	0	45
Martins 2021	Hand	Open	STR	Retrospective	Case series	Unknown	High	0	37
Meena 2021	Wrist	Mixed	ORIF	Retrospective	Case series	Clinical	High	2	25
Solari 2021	Hand	Closed	K-wire	Retrospective	Case series	Clinical	Low	9	200
Wang 2021	Hand	Closed	K-wire	Retrospective	Case series	Unknown	Low	0	20
Wang 2021	Hand	Closed	K-wire	Retrospective	Cohort	Unknown	High	0	20
Arora 2022	Wrist	Closed	ORIF	Retrospective	Case series	Clinical	Moderate	1	28
Choubey 2022	Wrist	Closed	ORIF	Prospective	Case series	Clinical	Moderate	1	28
Ibrahim 2022	Mixed	Open	Mixed	Retrospective	Case series	Clinical	High	0	17
Joo 2022	Wrist	Open	ORIF	Retrospective	Case series	Clinical	High	2	24

Liechti 2022	Wrist	Closed	ORIF	Prospective	Case series	Clinical	Low	0	28
Naguib 2022	Hand	Closed	Ex-Fix	Prospective	Case series	Clinical	Low	1	20
Wang 2022	Hand	Open	STR	Retrospective	Case series	Clinical	Moderate	0	24