

24 hours opioid consumption

Boohwi Hong

Package install

Data Preparation

Model Fitting

Results of Model

```
##      Length      Class      Mode
##           34 character character

## Original data (with adjusted standard errors for multi-arm studies):
##
##           treat1 treat2      TE  seTE seTE.adj narms multiarm
## Asar,2022      Control  ESPB   3.9100 0.7853  4.6792    2
## Ciftci,2020     Control  ESPB  11.0000 1.0200  5.7971    3      *
## Ciftci,2020           ESPB  TLIP  -0.0000 0.8856  5.7310    3      *
## Eskin,2020      Control  ESPB  11.6200 0.4157  4.6316    2
## Finnerty,2021   Control  ESPB   7.4000 5.7856  7.3995    2
## Ghamry,2019     Control  ESPB   4.3000 1.2179  4.7710    2
## Goel,2021       Control  ESPB   5.7020 0.3912  4.6294    2
## Jin,2021        Control  ESPB   2.5667 0.6754  4.6621    2
## Singh, 2020     Control  ESPB   5.8000 0.5590  4.6466    2
## Wahdan,2021    Control  ESPB  12.4000 0.1793  4.6164    2
## Yayik,2020     Control  ESPB  10.2000 1.8683  4.9769    2
## Yesiltas,2021  Control  ESPB  11.0000 2.6570  5.3234    2
## Yorukoglu,2021 Control  ESPB  15.7000 3.6635  5.8907    2
## Yu,2021         Control  ESPB  37.6500 2.8514  5.4230    2
## Zhang J,2021    Control  ESPB   1.3000 2.4611  5.2284    2
## Zhang Q,2021    Control  ESPB   2.7000 1.9739  5.0175    2
## Zhang TJ,2020   Control  ESPB  12.7000 0.7296  4.6702    2
## Zhu,2021        Control  ESPB  12.0000 2.3248  5.1656    2
## Ahiskalioglu,2018 Control  TLIP  20.7000 6.2079  7.7342    2
## Ammar,2018     Control  TLIP  16.1800 1.3880  4.8172    2
## Chen, 2019     Control  TLIP   7.9000 0.7586  4.6748    2
## Ciftci,2020     Control  TLIP  11.0000 1.0200  5.7971    3      *
## Ekinici,2020           TLIP   WI -16.5300 1.4736  4.8426    2
## Eltaher,2021   Control  TLIP   9.2000 0.5495  4.6455    2
## Ozmen,2019     Control  TLIP  29.6500 5.1741  6.9318    2
## Ersayli,2006   Control   WI  13.0000 1.2138  4.7699    2
## Esmail,2008    Control   WI   0.4700 1.3647  4.8105    2
```

```

## Gurbet,2008          Control    WI  12.5000  1.7053  4.9180  2
## Kraiwattanapong,2020 Control    WI   9.4000  2.1283  5.0802  2
## Mack,2001            Control    WI   5.1000  7.3093  8.6432  2
## Milligan,1993        Control    WI  13.9000  4.6969  6.5833  2
## Mohta,2019           Control    WI  21.0000  2.0872  5.0631  2
## Ozyilmaz,2012        Control    WI   8.9333  3.1633  5.5933  2
## Yorukoglu,2005       Control    WI   1.3333  2.0957  5.0666  2
##
## Number of treatment arms (by study):
##                narms
## Asar,2022                2
## Ciftci,2020               3
## Eskin,2020                2
## Finnerty,2021             2
## Ghamry,2019               2
## Goel,2021                 2
## Jin,2021                  2
## Singh, 2020               2
## Wahdan,2021               2
## Yayik,2020                2
## Yesiltas,2021            2
## Yorukoglu,2021           2
## Yu,2021                   2
## Zhang J,2021              2
## Zhang Q,2021              2
## Zhang TJ,2020             2
## Zhu,2021                  2
## Ahiskalioglu,2018         2
## Ammar,2018                2
## Chen, 2019                2
## Ekinici,2020              2
## Eltaher,2021              2
## Ozmen,2019                2
## Ersayli,2006              2
## Esmail,2008               2
## Gurbet,2008               2
## Kraiwattanapong,2020     2
## Mack,2001                 2
## Milligan,1993             2
## Mohta,2019                2
## Ozyilmaz,2012            2
## Yorukoglu,2005           2
##
## Results (random effects model):
##
##                treat1 treat2      MD      95%-CI
## Asar,2022          Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Ciftci,2020        Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Ciftci,2020          ESPB  TLIP  5.2784 [ 0.9709;  9.5859]
## Eskin,2020         Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Finnerty,2021      Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Ghamry,2019        Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Goel,2021          Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Jin,2021           Control  ESPB  9.7064 [ 7.3559; 12.0570]

```

```

## Singh, 2020          Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Wahdan,2021         Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Yayik,2020          Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Yesiltas,2021       Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Yorukoglu,2021     Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Yu,2021             Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Zhang J,2021        Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Zhang Q,2021        Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Zhang TJ,2020       Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Zhu,2021            Control  ESPB  9.7064 [ 7.3559; 12.0570]
## Ahiskalioglu,2018  Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Ammar,2018          Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Chen, 2019          Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Ciftci,2020         Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Ekinici,2020        TLIP     WI -6.6980 [-11.3716; -2.0243]
## Eltahir,2021        Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Ozmen,2019          Control  TLIP 14.9848 [ 11.2068; 18.7628]
## Ersayli,2006        Control  WI  8.2868 [ 4.9723; 11.6014]
## Esmail,2008          Control  WI  8.2868 [ 4.9723; 11.6014]
## Gurbet,2008         Control  WI  8.2868 [ 4.9723; 11.6014]
## Kraiwattanapong,2020 Control  WI  8.2868 [ 4.9723; 11.6014]
## Mack,2001           Control  WI  8.2868 [ 4.9723; 11.6014]
## Milligan,1993       Control  WI  8.2868 [ 4.9723; 11.6014]
## Mohta,2019          Control  WI  8.2868 [ 4.9723; 11.6014]
## Ozyilmaz,2012       Control  WI  8.2868 [ 4.9723; 11.6014]
## Yorukoglu,2005     Control  WI  8.2868 [ 4.9723; 11.6014]
##
## Number of studies: k = 32
## Number of pairwise comparisons: m = 34
## Number of treatments: n = 4
## Number of designs: d = 5
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .             .      .
## ESPB      -9.7064 [-12.0570; -7.3559] -8.09 < 0.0001
## TLIP     -14.9848 [-18.7628; -11.2068] -7.77 < 0.0001
## WI        -8.2868 [-11.6014; -4.9723] -4.90 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 21.2787; tau = 4.6129; I^2 = 96.8% [96.2%; 97.4%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           948.42  30 < 0.0001
## Within designs  853.81  27 < 0.0001
## Between designs  94.61   3 < 0.0001

## Number of studies: k = 32
## Number of pairwise comparisons: m = 34
## Number of treatments: n = 4
## Number of designs: d = 5

```

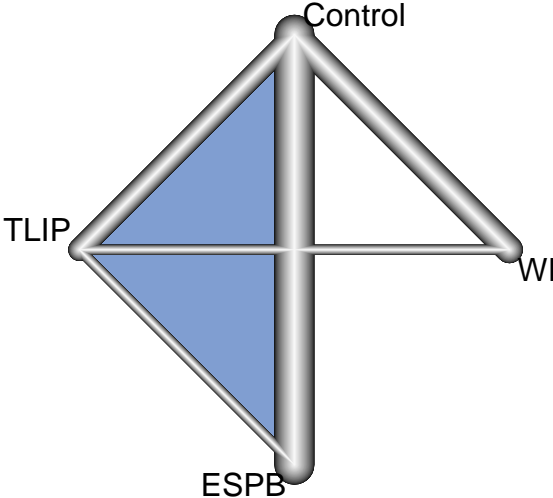
```

##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .           .           .      .
## ESPB      -9.7064 [-12.0570; -7.3559] -8.09 < 0.0001
## TLIP     -14.9848 [-18.7628; -11.2068] -7.77 < 0.0001
## WI       -8.2868 [-11.6014; -4.9723] -4.90 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 21.2787; tau = 4.6129; I^2 = 96.8% [96.2%; 97.4%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           948.42  30 < 0.0001
## Within designs  853.81  27 < 0.0001
## Between designs  94.61   3 < 0.0001

## Q statistics to assess homogeneity / consistency
##
##           Q df  p-value
## Total           948.42 30 < 0.0001
## Within designs  853.81 27 < 0.0001
## Between designs  94.61  3 < 0.0001
##
## Design-specific decomposition of within-designs Q statistic
##
##           Design      Q df  p-value
## Control vs ESPB 705.73 15 < 0.0001
## Control vs TLIP  46.23  4 < 0.0001
## Control vs WI  101.85  8 < 0.0001
##
## Between-designs Q statistic after detaching of single designs
##
##           Detached design      Q df  p-value
## Control vs ESPB 94.29  2 < 0.0001
## Control vs TLIP 71.65  2 < 0.0001
## Control vs WI  1.55  2  0.4615
## TLIP vs WI  1.55  2  0.4615
## Control vs ESPB vs TLIP 94.19  1 < 0.0001
##
## Q statistic to assess consistency under the assumption of
## a full design-by-treatment interaction random effects model
##
##           Q df  p-value tau.within tau2.within
## Between designs 6.36  3  0.0953  4.5645  20.8346

```

Network Graph

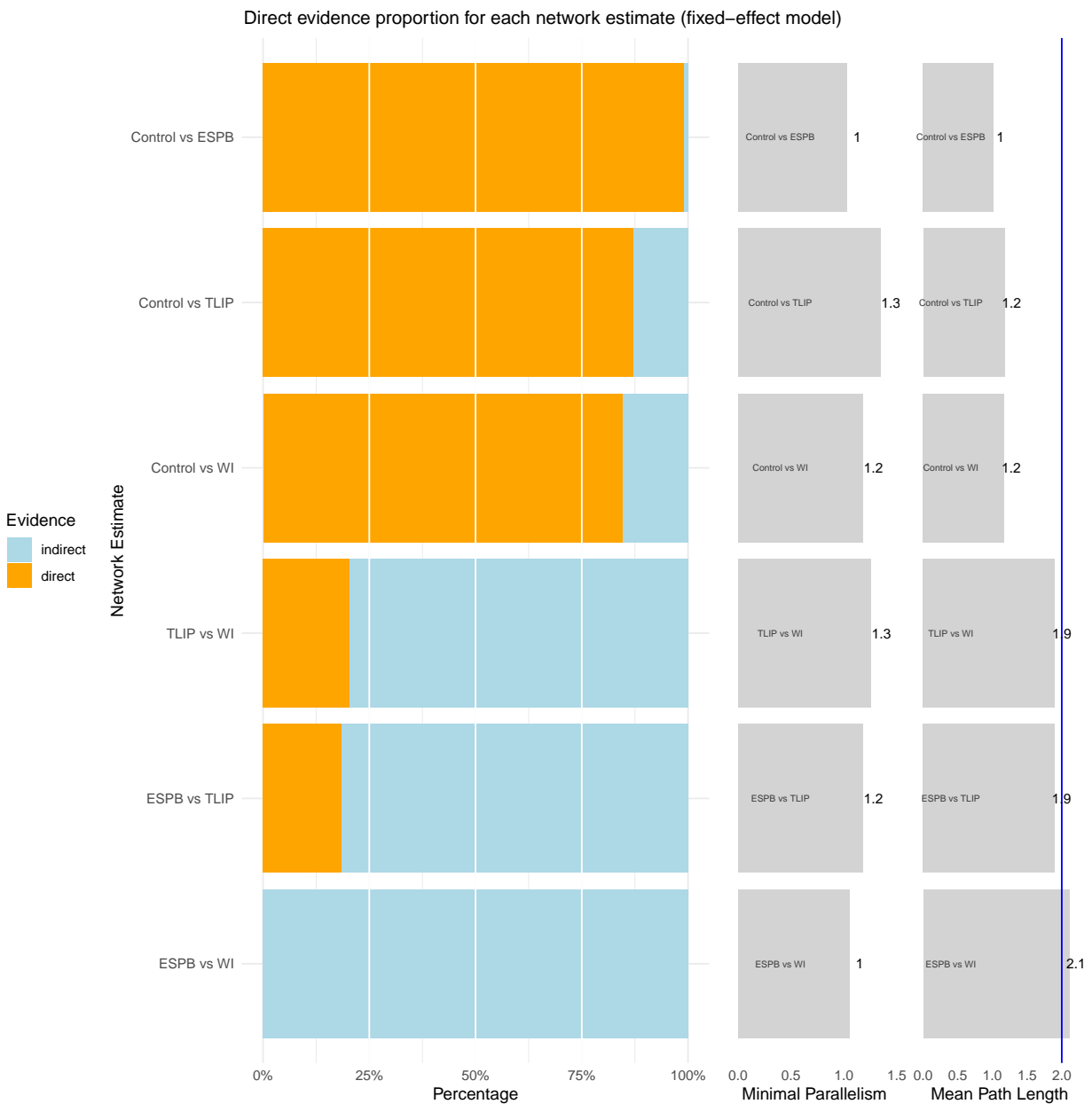


Visualizing Direct and Indirect Evidence

Extensive documentation for the dmetar package can be found at:
 ## www.bookdown.org/MathiasHarrer/Doing_Meta_Analysis_in_R/

Direct Evidence Proportion for each Network Estimate

```
## -----
##           Direct Indirect meanpath  minpar
## Control vs ESPB 0.9913  0.0087 1.014830 1.026628
## Control vs TLIP 0.8707  0.1293 1.176666 1.344522
## Control vs WI   0.8473  0.1527 1.172899 1.180198
## TLIP vs WI     0.2037  0.7963 1.901710 1.255829
## ESPB vs TLIP   0.1854  0.8146 1.898559 1.178654
## ESPB vs WI     0.0000  1.0000 2.107427 1.048385
```



Effect Estimate Table

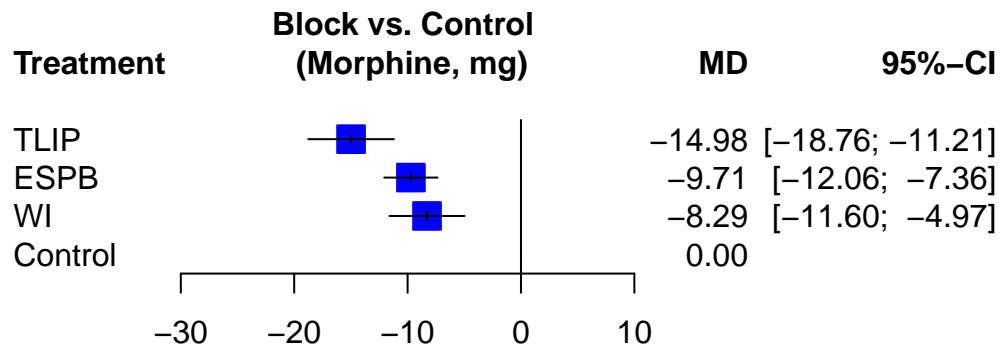
```
##           Control  ESPB  TLIP  WI
## Control          NA  9.706 14.985 8.287
## ESPB             NA   NA   5.278 -1.420
## TLIP             NA   NA   NA  -6.698
## WI               NA   NA   NA   NA
```

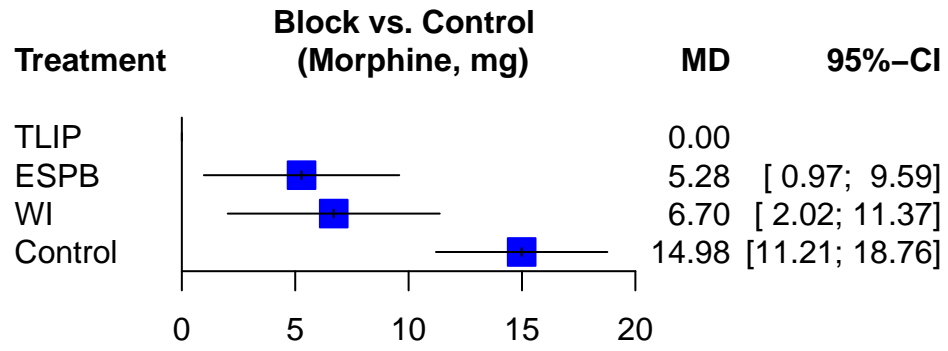
```
## League table (random effects model):
```

```
##
##           Control  9.50 ( 7.13; 11.87) 13.52 ( 9.32; 17.72)
##  9.71 ( 7.36; 12.06)           ESPB  0.00 ( -9.21; 9.21)
## 14.98 ( 11.21; 18.76) 5.28 ( 0.97; 9.59)           TLIP
##  8.29 ( 4.97; 11.60) -1.42 ( -5.46; 2.63) -6.70 (-11.37; -2.02)
##
##  9.62 ( 6.12; 13.12)
##
## -16.53 (-26.02; -7.04)
##           WI
```

Ranking and Forest plot

```
##          P-score
## TLIP      0.9965
## ESPB      0.5875
## WI        0.4161
## Control   0.0000
```

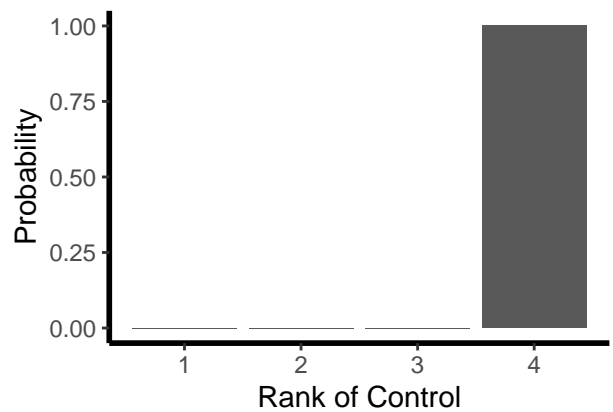
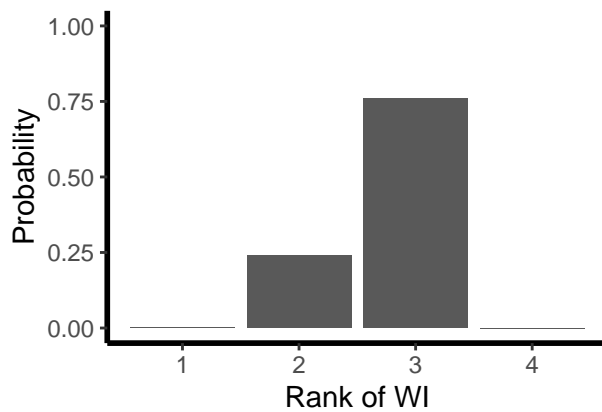
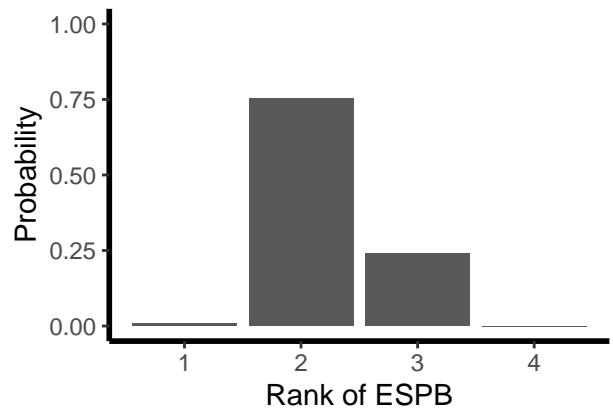
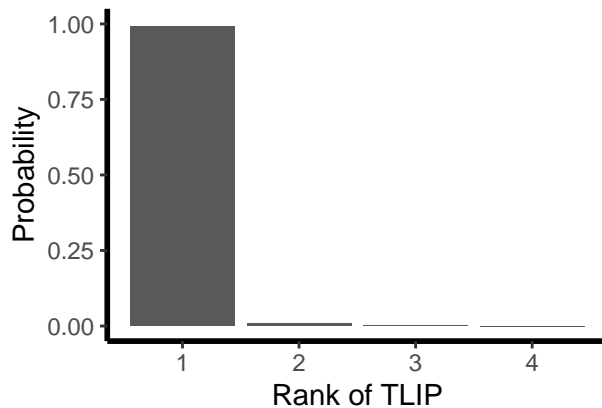


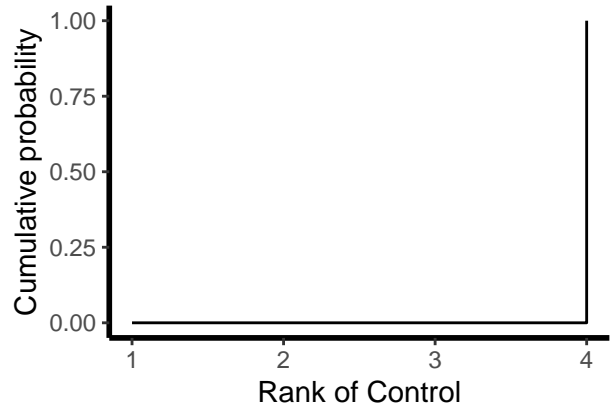
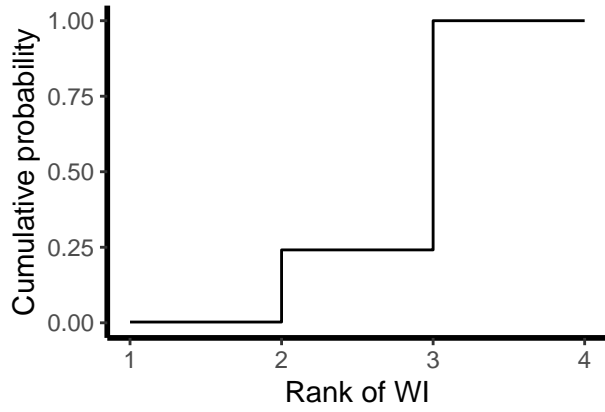
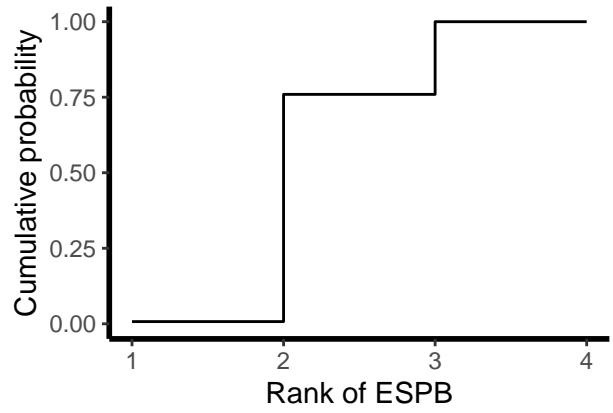
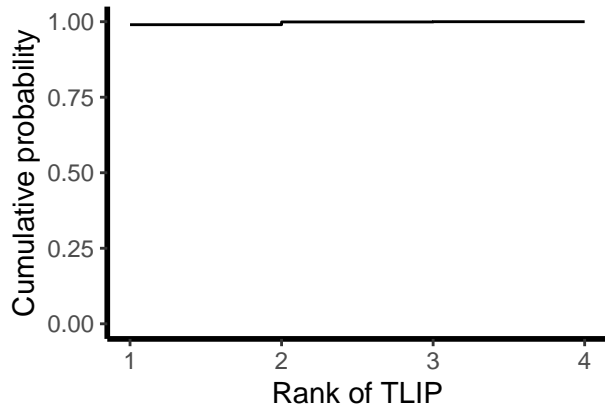


Rankogram by 100,000 simulation

This rankogram function calculates the probabilities of each treatment being at each possible rank and the SUCRAs (Surface Under the Cumulative RANking curve) in frequentist network meta-analysis.

```
## Rankogram (based on 1e+05 simulations)
##
## Common effects model:
##
##           1      2      3      4
## Control 0.0000 0.0000 0.0000 1.0000
## ESPB    0.2218 0.7782 0.0000 0.0000
## TLIP    0.7782 0.2218 0.0000 0.0000
## WI      0.0000 0.0000 1.0000 0.0000
##
## Random effects model:
##
##           1      2      3      4
## Control 0.0000 0.0000 0.0000 1.0000
## ESPB    0.0073 0.7521 0.2406 0.0000
## TLIP    0.9902 0.0091 0.0007 0.0000
## WI      0.0025 0.2388 0.7587 0.0000
```



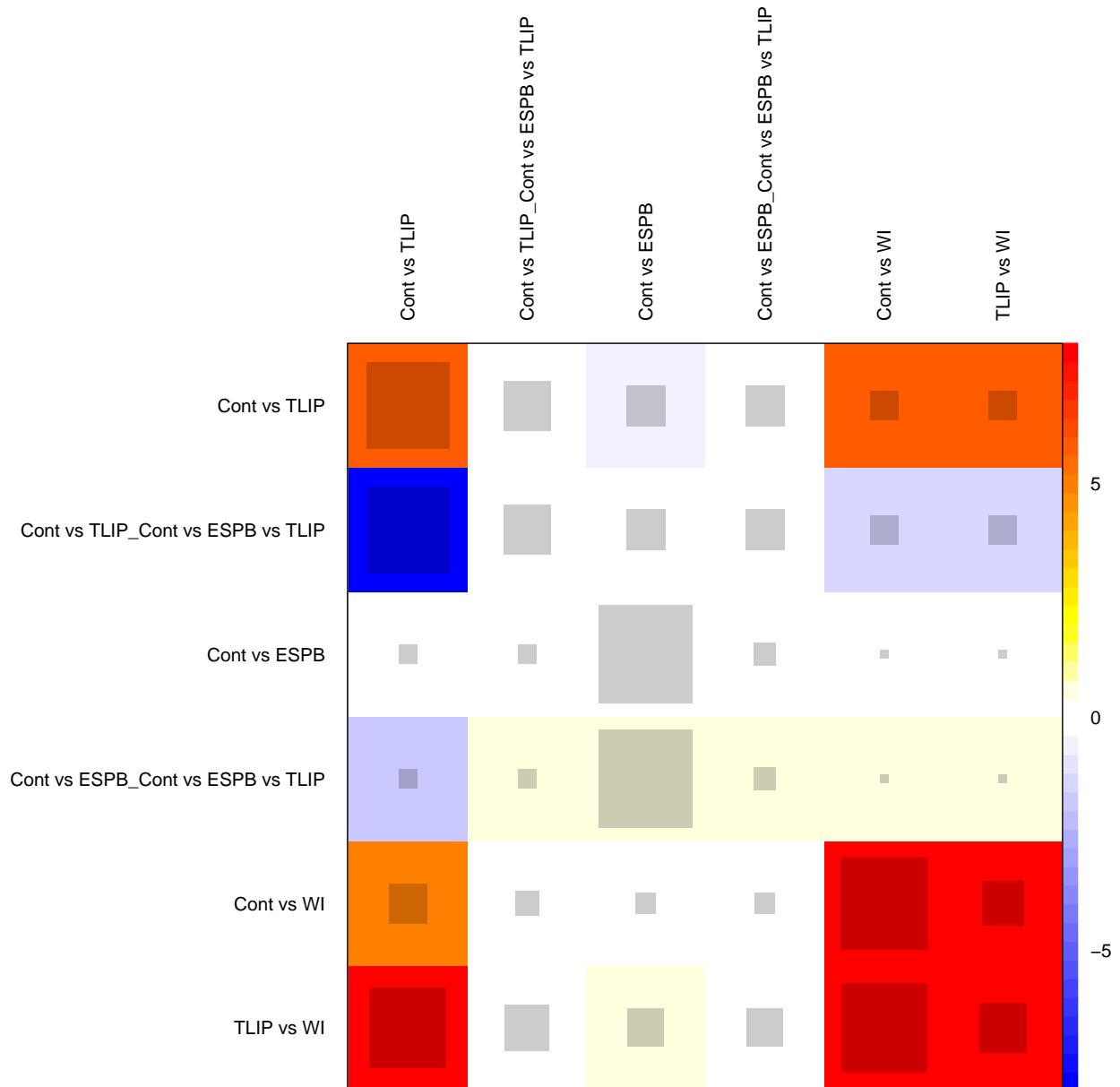


Net Heat Plot for evaluating the validity of the results

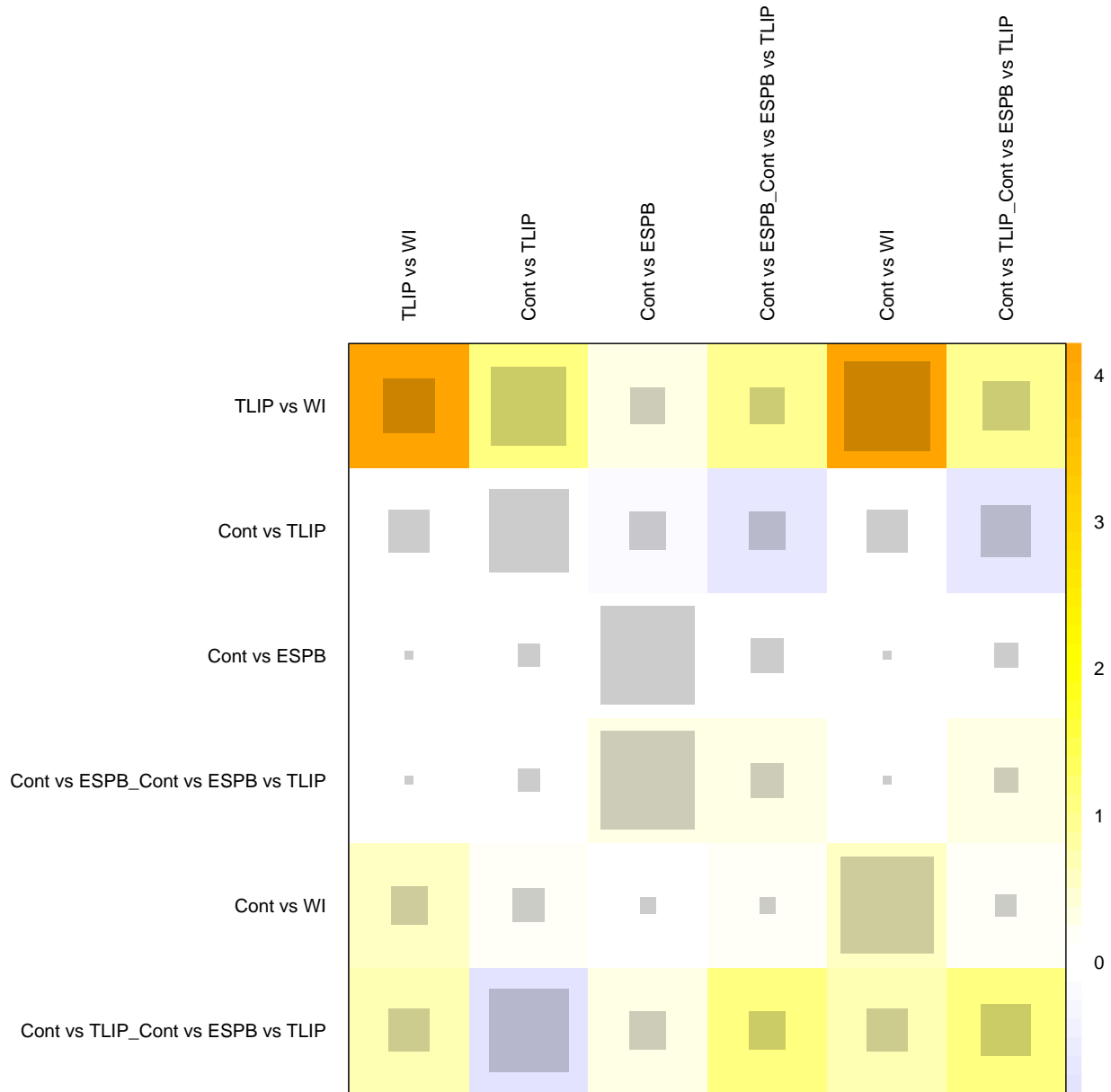
The gray boxes signify how important a treatment comparison is for the estimation of another treatment comparison. The bigger the box, the more important the comparison.

The colored backgrounds signify the amount of inconsistency of the design in a row that can be attributed to the design in a column. Field colors can range from a deep red (which indicates strong inconsistency) to blue (which indicates that evidence from this design supports evidence in the row).

Fixed effect model

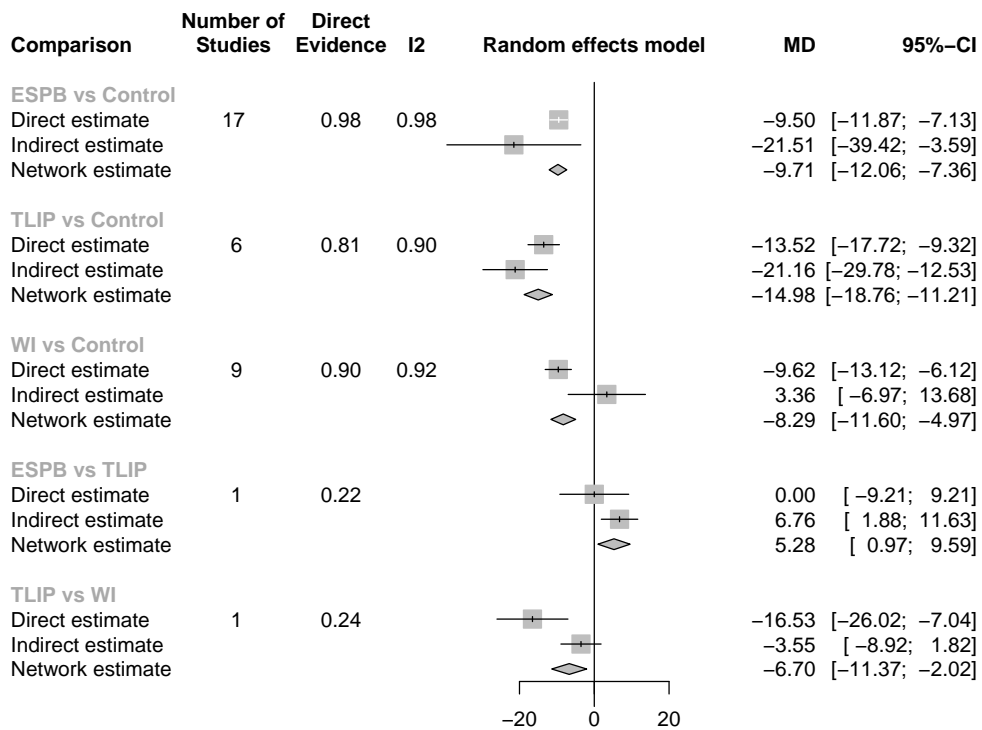


Random effect model

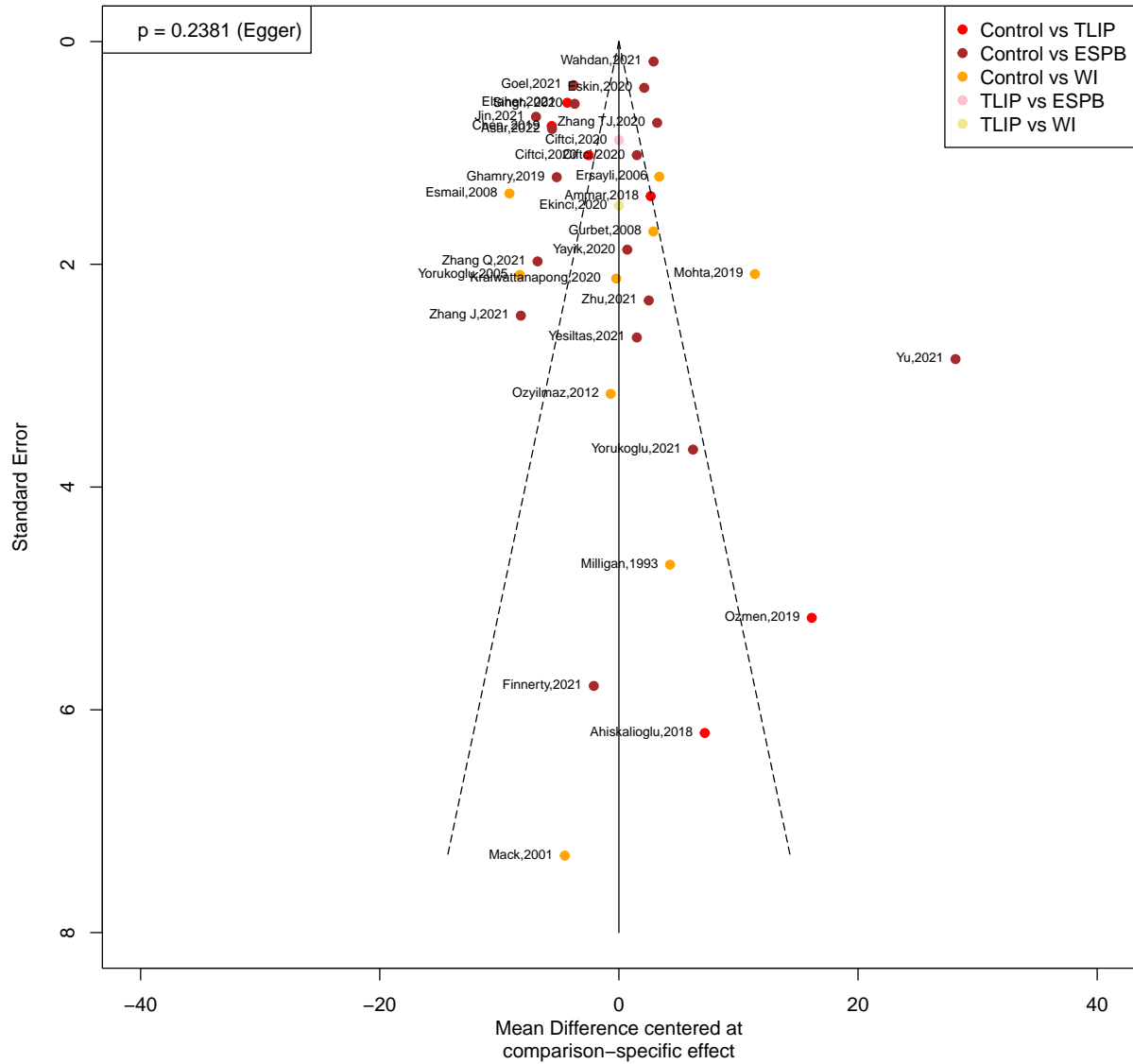


Net Splitting to check for consistency

```
## Separate indirect from direct evidence (SIDE) using back-calculation method
##
## Random effects model:
##
##      comparison k prop      nma  direct  indir.    Diff    z p-value
## ESPB vs Control 17 0.98 -9.7064 -9.4997 -21.5056 12.0059 1.30 0.1928
## TLIP vs Control  6 0.81 -14.9848 -13.5205 -21.1565  7.6360 1.56 0.1189
##  WI vs Control  9 0.90 -8.2868 -9.6236  3.3556 -12.9791 -2.33 0.0197
##   ESPB vs TLIP  1 0.22  5.2784  0.0000  6.7578 -6.7578 -1.27 0.2035
##   ESPB vs WI   0  0 -1.4196      . -1.4196      .      .
##   TLIP vs WI   1 0.24 -6.6980 -16.5300 -3.5509 -12.9791 -2.33 0.0197
##
## Legend:
## comparison - Treatment comparison
## k          - Number of studies providing direct evidence
## prop       - Direct evidence proportion
## nma        - Estimated treatment effect (MD) in network meta-analysis
## direct     - Estimated treatment effect (MD) derived from direct evidence
## indir.     - Estimated treatment effect (MD) derived from indirect evidence
## Diff       - Difference between direct and indirect treatment estimates
## z          - z-value of test for disagreement (direct versus indirect)
## p-value    - p-value of test for disagreement (direct versus indirect)
```



Comparison-Adjusted Funnel Plots



Exploratory subgroup analysis (Injection level of ESPB)

```

## Original data:
##
##          treat1  treat2      TE  seTE
## Asar,2022      Control Thoracic  3.9100 0.7853
## Ciftci,2020     Control Surgical 11.0000 1.0200
## Eskin,2020      Control Surgical 11.6200 0.4157
## Finnerty,2021  Control Surgical  7.4000 5.7856
## Ghamry,2019     Control  Lumbar   4.3000 1.2179
## Goel,2021       Control Surgical  5.7020 0.3912
## Jin,2021        Control Surgical  2.5667 0.6754
## Singh, 2020     Control Thoracic  5.8000 0.5590
## Wahdan,2021    Control Surgical 12.4000 0.1793
## Yayik,2020     Control  Lumbar  10.2000 1.8683
## Yesiltas,2021  Control Surgical 11.0000 2.6570
## Yorukoglu,2021 Control Surgical 15.7000 3.6635
## Yu,2021         Control Surgical 37.6500 2.8514
## Zhang J,2021   Control Thoracic  1.3000 2.4611
## Zhang Q,2021   Control  Lumbar   2.7000 1.9739
## Zhang TJ,2020  Control Thoracic 12.7000 0.7296
## Zhu,2021       Control  Lumbar  12.0000 2.3248
##
## Number of treatment arms (by study):
##          narms
## Asar,2022          2
## Ciftci,2020        2
## Eskin,2020         2
## Finnerty,2021     2
## Ghamry,2019       2
## Goel,2021         2
## Jin,2021          2
## Singh, 2020       2
## Wahdan,2021      2
## Yayik,2020       2
## Yesiltas,2021    2
## Yorukoglu,2021  2
## Yu,2021           2
## Zhang J,2021     2
## Zhang Q,2021     2
## Zhang TJ,2020    2
## Zhu,2021         2
##
## Results (random effects model):
##
##          treat1  treat2      MD      95%-CI
## Asar,2022      Control Thoracic  6.1950 [1.7066; 10.6834]
## Ciftci,2020     Control Surgical 12.1965 [9.0065; 15.3866]
## Eskin,2020      Control Surgical 12.1965 [9.0065; 15.3866]
## Finnerty,2021  Control Surgical 12.1965 [9.0065; 15.3866]
## Ghamry,2019     Control  Lumbar   7.1569 [2.4754; 11.8385]
## Goel,2021       Control Surgical 12.1965 [9.0065; 15.3866]
## Jin,2021        Control Surgical 12.1965 [9.0065; 15.3866]
## Singh, 2020     Control Thoracic  6.1950 [1.7066; 10.6834]

```

```

## Wahdan,2021    Control Surgical 12.1965 [9.0065; 15.3866]
## Yayik,2020     Control Lumbar 7.1569 [2.4754; 11.8385]
## Yesiltas,2021 Control Surgical 12.1965 [9.0065; 15.3866]
## Yorukoglu,2021 Control Surgical 12.1965 [9.0065; 15.3866]
## Yu,2021        Control Surgical 12.1965 [9.0065; 15.3866]
## Zhang J,2021   Control Thoracic 6.1950 [1.7066; 10.6834]
## Zhang Q,2021   Control Lumbar 7.1569 [2.4754; 11.8385]
## Zhang TJ,2020 Control Thoracic 6.1950 [1.7066; 10.6834]
## Zhu,2021       Control Lumbar 7.1569 [2.4754; 11.8385]
##
## Number of studies: k = 17
## Number of pairwise comparisons: m = 17
## Number of treatments: n = 4
## Number of designs: d = 3
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .         .      .
## Lumbar    -7.1569 [-11.8385; -2.4754] -3.00  0.0027
## Surgical -12.1965 [-15.3866; -9.0065] -7.49 < 0.0001
## Thoracic  -6.1950 [-10.6834; -1.7066] -2.71  0.0068
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 19.3403; tau = 4.3978; I^2 = 97.6% [97.0%; 98.2%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total          594.48  14 < 0.0001
## Within designs  594.48  14 < 0.0001
## Between designs  0.00   0      --

## Number of studies: k = 17
## Number of pairwise comparisons: m = 17
## Number of treatments: n = 4
## Number of designs: d = 3
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .         .      .
## Lumbar    -7.1569 [-11.8385; -2.4754] -3.00  0.0027
## Surgical -12.1965 [-15.3866; -9.0065] -7.49 < 0.0001
## Thoracic  -6.1950 [-10.6834; -1.7066] -2.71  0.0068
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 19.3403; tau = 4.3978; I^2 = 97.6% [97.0%; 98.2%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total          594.48  14 < 0.0001
## Within designs  594.48  14 < 0.0001

```

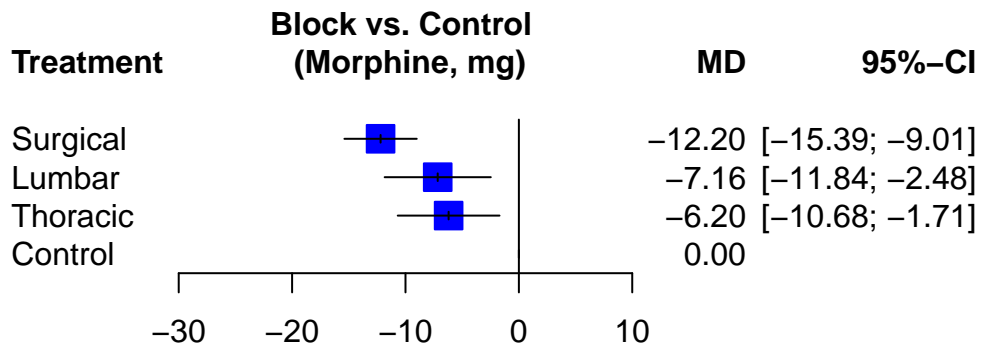
```
## Between designs 0.00 0 --
```

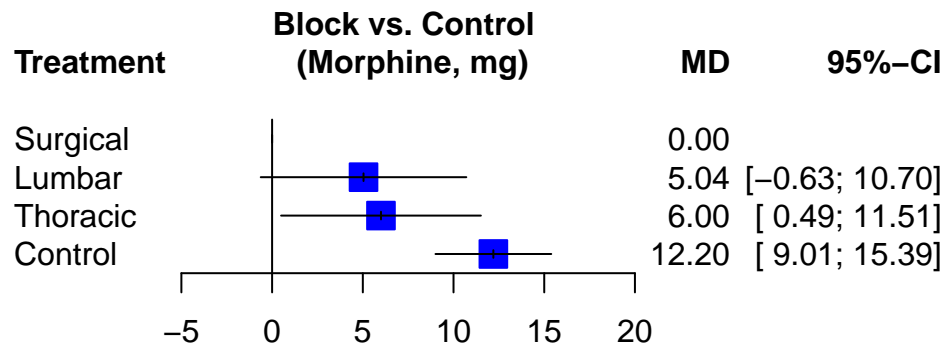
```
## Control Lumbar Surgical Thoracic
## Control NA 7.157 12.197 6.195
## Lumbar NA NA 5.040 -0.962
## Surgical NA NA NA -6.001
## Thoracic NA NA NA NA
```

```
## League table (random effects model):
```

```
##
## Control 7.16 ( 2.48; 11.84) 12.20 ( 9.01; 15.39)
## 7.16 ( 2.48; 11.84) Lumbar .
## 12.20 ( 9.01; 15.39) 5.04 ( -0.63; 10.70) Surgical
## 6.20 ( 1.71; 10.68) -0.96 ( -7.45; 5.52) -6.00 (-11.51; -0.49)
##
## 6.20 ( 1.71; 10.68)
## .
## .
## Thoracic
```

```
## P-score
## Surgical 0.9810
## Lumbar 0.5512
## Thoracic 0.4662
## Control 0.0016
```





Exploratory subgroup analysis (Plane of TLIP)

```

## Original data:
##
##          treat1          treat2      TE  seTE
## Ahiskalioglu,2018 Control Modified plane (Lateral) 20.7000 6.2079
## Ammar,2018      Control Original plane (Medial) 16.1800 1.3880
## Chen, 2019      Control Original plane (Medial) 7.9000 0.7586
## Ciftci,2020     Control Modified plane (Lateral) 11.0000 1.0200
## Eltaher,2021    Control Original plane (Medial) 9.2000 0.5495
## Ozmen,2019      Control Modified plane (Lateral) 29.6500 5.1741
##
## Number of treatment arms (by study):
##          narms
## Ahiskalioglu,2018 2
## Ammar,2018        2
## Chen, 2019        2
## Ciftci,2020       2
## Eltaher,2021     2
## Ozmen,2019       2
##
## Results (random effects model):
##
##          treat1          treat2      MD          95%-CI
## Ahiskalioglu,2018 Control Modified plane (Lateral) 16.5551 [10.9045; 22.2057]
## Ammar,2018      Control Original plane (Medial) 10.9141 [ 6.8052; 15.0229]
## Chen, 2019      Control Original plane (Medial) 10.9141 [ 6.8052; 15.0229]
## Ciftci,2020     Control Modified plane (Lateral) 16.5551 [10.9045; 22.2057]
## Eltaher,2021    Control Original plane (Medial) 10.9141 [ 6.8052; 15.0229]
## Ozmen,2019      Control Modified plane (Lateral) 16.5551 [10.9045; 22.2057]
##
## Number of studies: k = 6
## Number of pairwise comparisons: m = 6
## Number of treatments: n = 3
## Number of designs: d = 2
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##          MD          95%-CI      z  p-value
## Control          .          .          .          .
## Modified plane (Lateral) -16.5551 [-22.2057; -10.9045] -5.74 < 0.0001
## Original plane (Medial) -10.9141 [-15.0229; -6.8052] -5.21 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 12.2870; tau = 3.5053; I^2 = 90.6% [80.9%; 95.3%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##          Q  d.f.  p-value
## Total          42.45    4 < 0.0001
## Within designs 42.45    4 < 0.0001
## Between designs 0.00    0      --
##
## Number of studies: k = 6

```

```

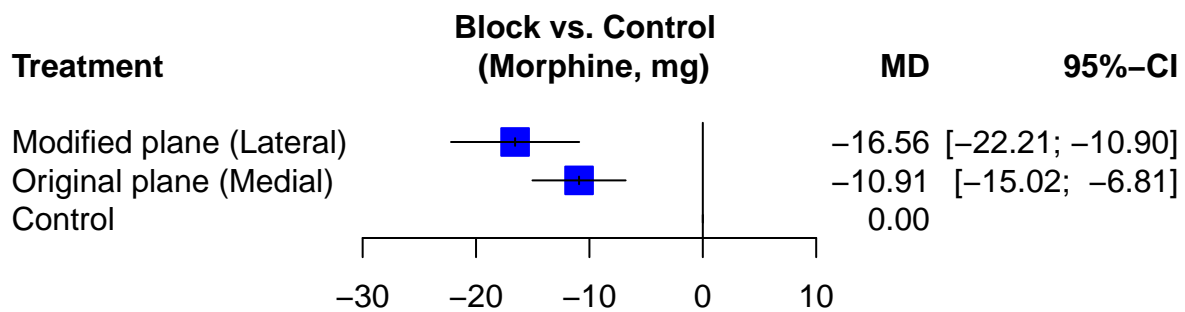
## Number of pairwise comparisons: m = 6
## Number of treatments: n = 3
## Number of designs: d = 2
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##
##           MD           95%-CI      z  p-value
## Control           .           .           .
## Modified plane (Lateral) -16.5551 [-22.2057; -10.9045] -5.74 < 0.0001
## Original plane (Medial)  -10.9141 [-15.0229;  -6.8052] -5.21 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 12.2870; tau = 3.5053; I^2 = 90.6% [80.9%; 95.3%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##
##           Q d.f.  p-value
## Total           42.45    4 < 0.0001
## Within designs  42.45    4 < 0.0001
## Between designs  0.00    0      --

##
##           Control Modified plane (Lateral)
## Control           NA           16.555
## Modified plane (Lateral)  NA           NA
## Original plane (Medial)   NA           NA
##
##           Original plane (Medial)
## Control           10.914
## Modified plane (Lateral)  -5.641
## Original plane (Medial)   NA

## League table (random effects model):
##
##           Control  16.56 ( 10.90; 22.21)  10.91 ( 6.81; 15.02)
## 16.56 ( 10.90; 22.21) Modified plane (Lateral)  .
## 10.91 ( 6.81; 15.02)  -5.64 (-12.63;  1.35) Original plane (Medial)

##
##           P-score
## Modified plane (Lateral)  0.9716
## Original plane (Medial)   0.5284
## Control                   0.0000

```



Exploratory subgroup analysis

(ESPB_sugrical level vs TLIP)

```
## Original data (with adjusted standard errors for multi-arm studies):
##
##          treat1 treat2      TE   seTE seTE.adj narms multiarm
## Ciftci,2020   Control  ESPB 11.0000 1.0200  5.3471    3      *
## Ciftci,2020           ESPB  TLIP -0.0000 0.8856  5.2754    3      *
## Eskin,2020    Control  ESPB 11.6200 0.4157  4.2553    2
## Finnerty,2021 Control  ESPB  7.4000 5.7856  7.1700    2
## Goel,2021     Control  ESPB  5.7020 0.3912  4.2530    2
## Jin,2021      Control  ESPB  2.5667 0.6754  4.2885    2
## Wahdan,2021   Control  ESPB 12.4000 0.1793  4.2388    2
## Yesiltas,2021 Control  ESPB 11.0000 2.6570  4.9995    2
## Yorukoglu,2021 Control  ESPB 15.7000 3.6635  5.5997    2
## Yu,2021       Control  ESPB 37.6500 2.8514  5.1055    2
## Ahiskalioglu,2018 Control  TLIP 20.7000 6.2079  7.5149    2
## Ammar,2018    Control  TLIP 16.1800 1.3880  4.4567    2
## Chen, 2019    Control  TLIP  7.9000 0.7586  4.3024    2
## Ciftci,2020   Control  TLIP 11.0000 1.0200  5.3471    3      *
## Eltaher,2021 Control  TLIP  9.2000 0.5495  4.2705    2
## Ozmen,2019   Control  TLIP 29.6500 5.1741  6.6863    2
##
## Number of treatment arms (by study):
##          narms
## Ciftci,2020      3
## Eskin,2020       2
## Finnerty,2021    2
## Goel,2021        2
## Jin,2021         2
## Wahdan,2021      2
## Yesiltas,2021    2
## Yorukoglu,2021  2
## Yu,2021          2
## Ahiskalioglu,2018 2
## Ammar,2018       2
## Chen, 2019       2
## Eltaher,2021    2
## Ozmen,2019      2
##
## Results (random effects model):
##
##          treat1 treat2      MD          95%-CI
## Ciftci,2020   Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Ciftci,2020           ESPB  TLIP  1.0342 [-3.5650;  5.6334]
## Eskin,2020    Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Finnerty,2021 Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Goel,2021     Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Jin,2021      Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Wahdan,2021   Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Yesiltas,2021 Control  ESPB 12.2983 [ 9.2609; 15.3357]
## Yorukoglu,2021 Control  ESPB 12.2983 [ 9.2609; 15.3357]
```



```

## Yu,2021          Control   ESPB 12.2983 [ 9.2609; 15.3357]
## Ahiskalioglu,2018 Control   TLIP 13.3325 [ 9.5403; 17.1247]
## Ammar,2018      Control   TLIP 13.3325 [ 9.5403; 17.1247]
## Chen, 2019      Control   TLIP 13.3325 [ 9.5403; 17.1247]
## Ciftci,2020     Control   TLIP 13.3325 [ 9.5403; 17.1247]
## Eltahir,2021    Control   TLIP 13.3325 [ 9.5403; 17.1247]
## Ozmen,2019      Control   TLIP 13.3325 [ 9.5403; 17.1247]
##
## Number of studies: k = 14
## Number of pairwise comparisons: m = 16
## Number of treatments: n = 3
## Number of designs: d = 3
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .         .         .
## ESPB    -12.2983 [-15.3357; -9.2609] -7.94 < 0.0001
## TLIP    -13.3325 [-17.1247; -9.5403] -6.89 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 17.9351; tau = 4.2350; I^2 = 97.6% [96.9%; 98.1%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           540.13   13 < 0.0001
## Within designs  537.96   11 < 0.0001
## Between designs   2.18    2  0.3368

## Number of studies: k = 14
## Number of pairwise comparisons: m = 16
## Number of treatments: n = 3
## Number of designs: d = 3
##
## Random effects model
##
## Treatment estimate (sm = 'MD', comparison: other treatments vs 'Control'):
##           MD           95%-CI      z  p-value
## Control      .             .         .         .
## ESPB    -12.2983 [-15.3357; -9.2609] -7.94 < 0.0001
## TLIP    -13.3325 [-17.1247; -9.5403] -6.89 < 0.0001
##
## Quantifying heterogeneity / inconsistency:
## tau^2 = 17.9351; tau = 4.2350; I^2 = 97.6% [96.9%; 98.1%]
##
## Tests of heterogeneity (within designs) and inconsistency (between designs):
##           Q d.f.  p-value
## Total           540.13   13 < 0.0001
## Within designs  537.96   11 < 0.0001
## Between designs   2.18    2  0.3368

##           Control   ESPB   TLIP
## Control      NA 12.298 13.332

```

```
## ESPB      NA      NA  1.034
## TLIP      NA      NA      NA
```

```
## League table (random effects model):
```

```
##
##           Control  16.56 ( 10.90; 22.21)  10.91 (  6.81; 15.02)
## 16.56 ( 10.90; 22.21) Modified plane (Lateral) .
## 10.91 (  6.81; 15.02) -5.64 (-12.63;  1.35) Original plane (Medial)
```

```
##           P-score
## TLIP      0.8351
## ESPB      0.6649
## Control   0.0000
```

