Syndesmotic Fixation: Suture button or Screws

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Case 1: 27yo F fall on stairs

Case 2: 42yo obese M MCC

Syndesmosis controversies

- Reduction
  - Technique
  - Open vs radiographic assessment
- Fixation
  - Number of screws
  - Size of screws
  - Tricortical vs quadricortical

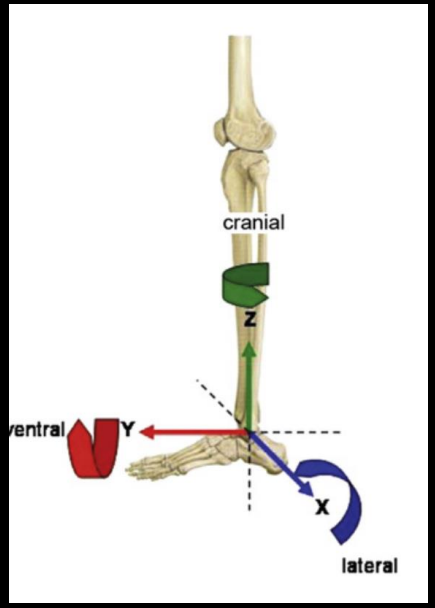
Syndesmosis controversies

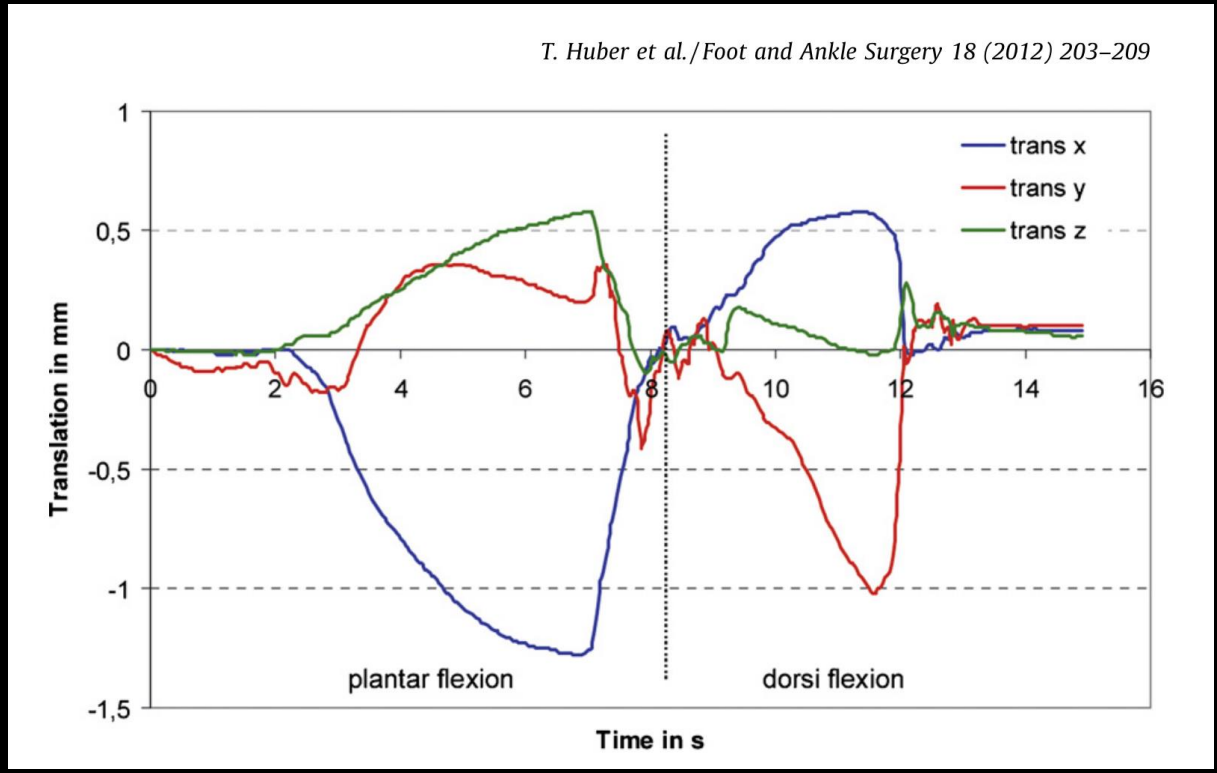
- Reduction
  - Technique
  - Open vs radiographic assessment

- Fixation
  - Number of screws
  - Size of screws
  - Tricortical vs quadricortical
  - **Screws vs Suture Button**

Problems with screws

Rigid fixation of a mobile articulation



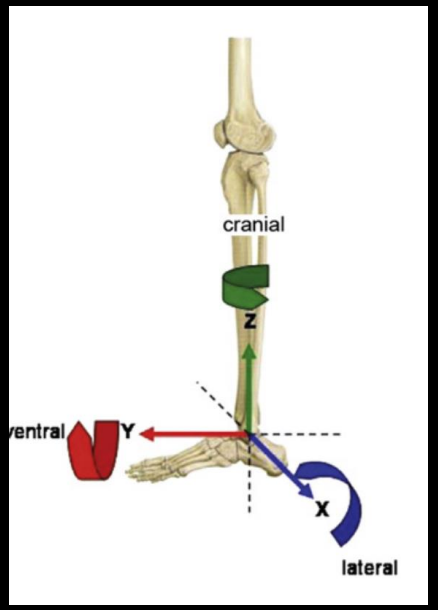


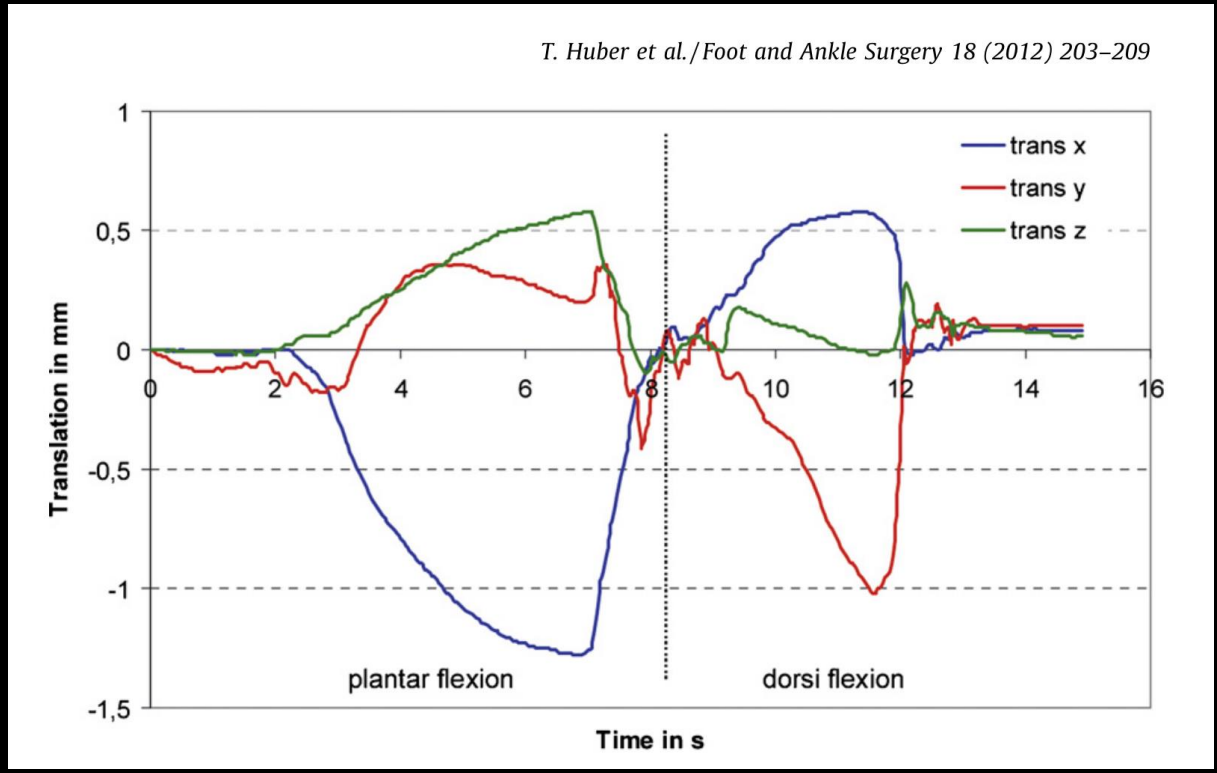
Problems with screws

Rigid fixation of a mobile articulation

→Definitely

- Higher risk of loosening or breakage
- Need for implant removal





Problems with screws

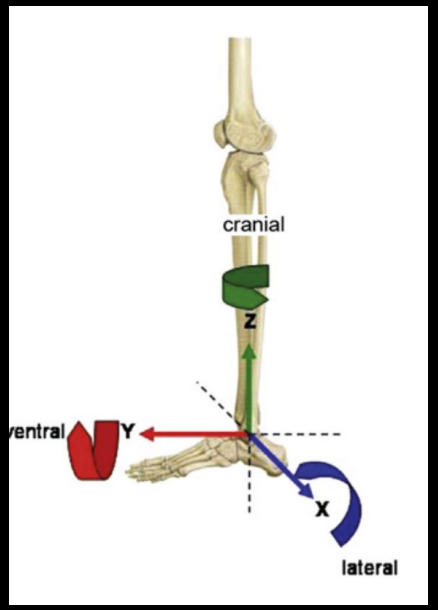
Rigid fixation of a mobile articulation

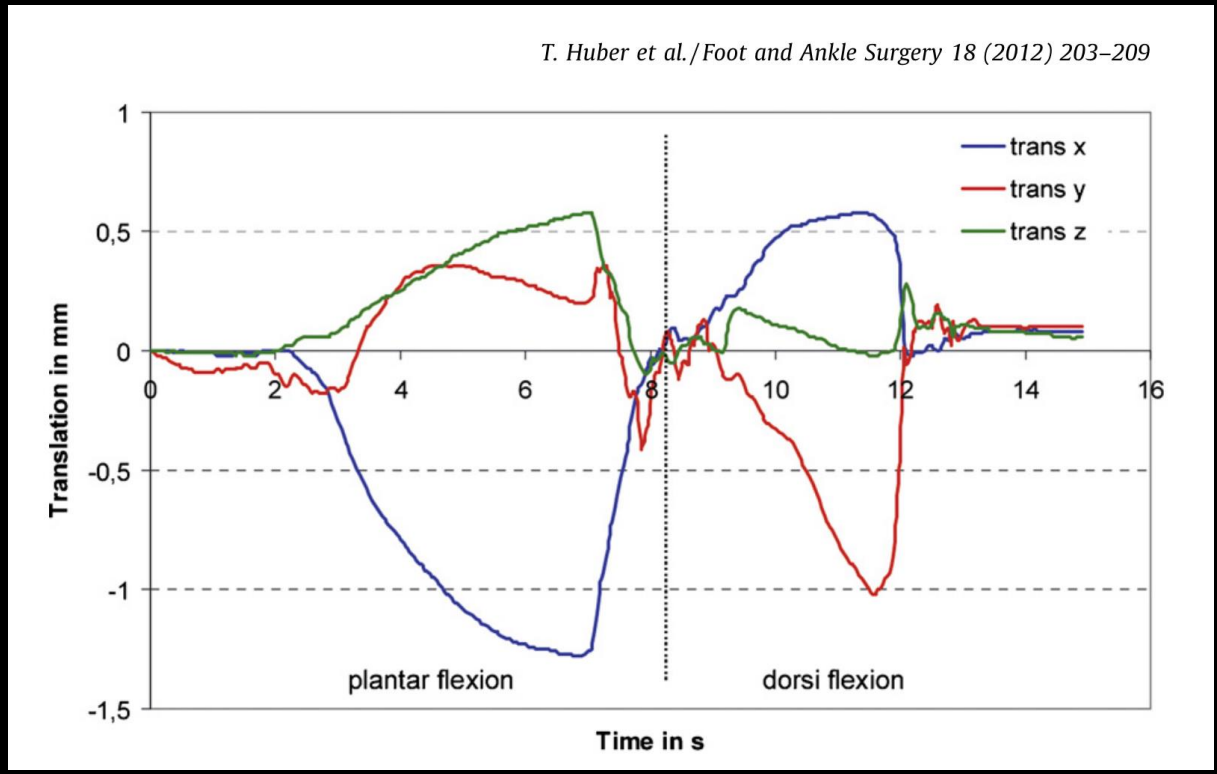
→Definitely

- Higher risk of loosening or breakage
- Need for implant removal

→Probably

- Worse ankle function





Comparison of Outcomes Between Suture Button Technique and Screw Fixation Technique in Patients With Acute Syndesmotic Diastasis: A Meta-analysis of Randomized Controlled Trials

Nikolai Ramadanov, MD[1,2], Simon Bueschges[3], and Dobromir Dimitrov, Prof. MD[4]

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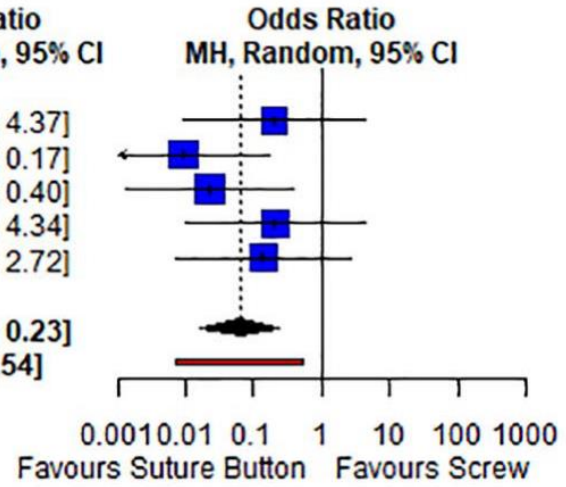
- Meta-analysis
- 8 RCTs suture button vs screws

Implant failure

Study	Suture Button Events	Suture Button Total	Screw Events	Screw Total	Weight	Odds Ratio MH, Random, 95% CI
Coetzee and Ebeling 2009	0	12	0	12	0.0%	
Colcuc et al. 2018	0	26	2	28	18.8%	0.20 [0.01; 4.37]
Kortekangas et al. 2015	0	21	16	22	20.5%	0.01 [0.00; 0.17]
Laflamme et al. 2015	0	34	14	36	21.7%	0.02 [0.00; 0.40]
Raeder et al. 2020	0	55	2	58	19.1%	0.20 [0.01; 4.34]
Raeder et al. 2020[2]	0	48	3	49	20.0%	0.14 [0.01; 2.72]
Total (95% CI)		**196**		**205**	**100.0%**	**0.06 [0.02; 0.23]**
Prediction interval						**[0.01; 0.54]**

Heterogeneity: $Tau^2 = 0$; $Chi^2 = 3.59$, df = 4 (P = 0.46); $I^2 = 0\%$
Test for overall effect: Z = -4.09 (P < 0.01)



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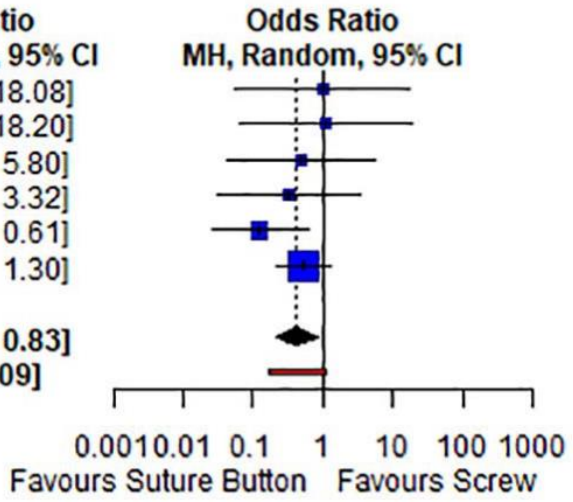
Implant failure

Reoperation

Study	Suture Button Events	Suture Button Total	Screw Events	Screw Total	Weight	Odds Ratio MH, Random, 95% CI
Coetzee and Ebeling 2009	1	12	1	12	5.3%	1.00 [0.06; 18.08]
Colcuc et al. 2018	1	26	1	28	5.6%	1.08 [0.06; 18.20]
Giza et al. 2019	1	32	2	33	7.4%	0.50 [0.04; 5.80]
Kortekangas et al. 2015	1	21	3	22	8.0%	0.32 [0.03; 3.32]
Laflamme et al. 2015	2	34	12	36	17.6%	0.13 [0.03; 0.61]
Raeder et al. 2020	10	55	17	58	56.2%	0.54 [0.22; 1.30]
Total (95% CI)		**180**		**189**	**100.0%**	**0.43 [0.22; 0.83]**
Prediction interval						**[0.17; 1.09]**

Heterogeneity: $Tau^2 = 0$; $Chi^2 = 3.41$, df = 5 (P = 0.64); $I^2 = 0\%$
Test for overall effect: Z = -2.52 (P = 0.01)



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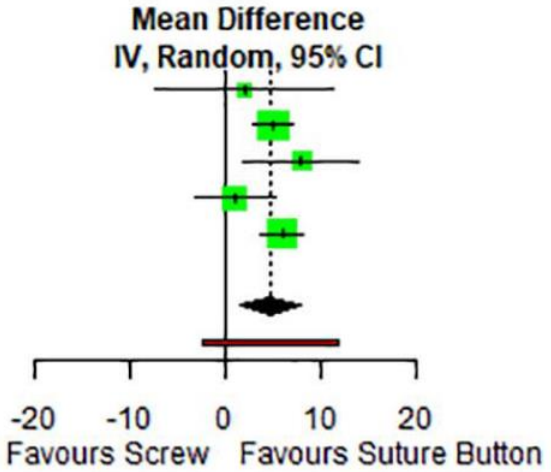
Implant failure

Reoperation

AOFAS < 6 months postoperatively

	Suture Button			Screw				Mean Difference
Study	Mean	SD	Total	Mean	SD	Total	Weight	IV, Random, 95% CI
Colcuc et al. 2018	73.00	20.00	26	71.00	15.00	28	5.9%	2.00 [-7.49; 11.49]
Giza et al. 2019	63.00	2.00	32	58.00	6.00	33	31.8%	5.00 [2.84; 7.16]
Laflamme et al. 2015	79.00	11.00	34	71.00	15.00	36	11.8%	8.00 [1.86; 14.14]
Raeder et al. 2020	67.00	10.00	55	66.00	13.00	58	18.8%	1.00 [-3.26; 5.26]
Raeder et al. 2020[2]	64.00	6.00	48	58.00	5.00	49	31.6%	6.00 [3.80; 8.20]
Total (95% CI)			**195**			**204**	**100.0%**	**4.74 [1.68; 7.80]**
Prediction interval								**[-2.44; 11.92]**

Heterogeneity: $Tau^2 = 3.8735$; $Chi^2 = 5.47$, df = 4 (P = 0.24); $I^2 = 27\%$
Test for overall effect: $t_4 = 4.30$ (P = 0.01)



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Implant failure

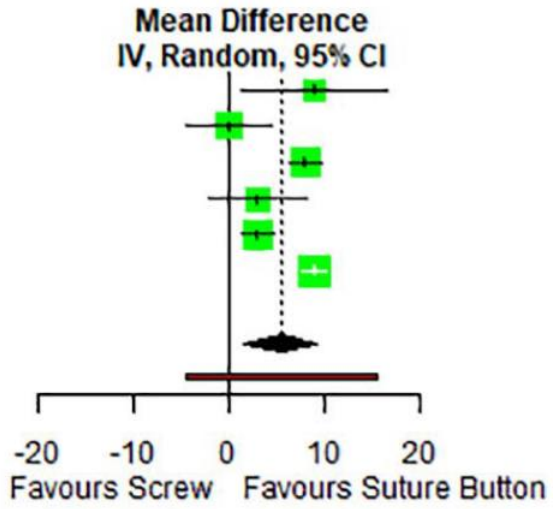
Reoperation

AOFAS < 6 months postoperatively

AOFAS 12 months postoperatively

Study	Suture Button Mean	SD	Total	Screw Mean	SD	Total	Weight	Mean Difference IV, Random, 95% CI
Coetzee and Ebeling 2009	85.00	9.00	12	76.00	10.00	12	9.2%	9.00 [1.39; 16.61]
Colcuc et al. 2018	91.00	9.00	26	91.00	8.00	28	14.8%	0.00 [-4.56; 4.56]
Giza et al. 2019	98.00	3.00	32	90.00	4.00	33	20.7%	8.00 [6.28; 9.72]
Laflamme et al. 2015	93.00	9.00	34	90.00	13.00	36	13.4%	3.00 [-2.21; 8.21]
Raeder et al. 2020	93.00	5.00	55	90.00	4.00	58	20.8%	3.00 [1.32; 4.68]
Raeder et al. 2020[a]	96.00	3.00	48	87.00	4.00	49	21.2%	9.00 [7.59; 10.41]
Total (95% CI)			**207**			**216**	**100.0%**	**5.42 [1.50; 9.33]**
Prediction interval								**[-4.63; 15.47]**

Heterogeneity: $Tau^2 = 10.7811$; $Chi^2 = 41.79$, df = 5 ($P < 0.01$); $I^2 = 88\%$
Test for overall effect: $t_5 = 3.55$ ($P = 0.02$)



Why no suture button?

- Older, lower demand
- Diabetic/Obese/Non-compliant with fracture-dislocation
- Length unstable fibula without fixation (Maissoneuve)
- Higher Cost implant (?)

Suture Button Fixation Versus Syndesmotic Screws in Supination–External Rotation Type 4 Injuries

A Cost-Effectiveness Analysis

The American Journal of Sports Medicine, Vol. 45, No. 1
DOI: 10.1177/0363546516664713

Kaitlin C. Neary,*† MD, Matthew A. Mormino,† MD, and Hongmei Wang,† PhD
Investigation performed at the University of Nebraska Medical Center, Omaha, Nebraska, USA

- Main assumptions

	Screw	Suture Button
Cost	$62	$880
Hardware removal	20%	4%

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TABLE 4
Comparison of Cost, Effectiveness, and Dollars per QALY for Each Treatment Scenario[a]

	One TightRope	Two TightRopes	One 3.5-mm Screw	Two 3.5-mm Screws
Total cost, US$	19,354	20,235	20,803	20,836
Total effectiveness	5.874	5.874	5.816	5.816
$/QALY	3294	3445	3576	3583

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Suture button less costly, but more effective

Case 1: 27yo F fall on stairs

?


ARMOR
C-ARMOR




Case 2: 42yo obese M MCC

Reduction Sequence

- ”Thumb reduction”
- Smooth “glide wire”
- Apply clamp only if needed
- Insert fixation

Assess reduction

- Open
- Radiographic vs contralateral

Take-home messages

- Suture buttons likely superior to screw fixation
- BUT screws preferred if
  - Older, low demand
  - Fracture-dislocations in high-risk patients
  - Length unstable fibula
- Flexible fixation technically straightforward

Thank you!