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Faster on Their Feet: An Optimised, Patient-Centred Route to Early Prosthetic Fitting

A SwedeAmp study

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Background

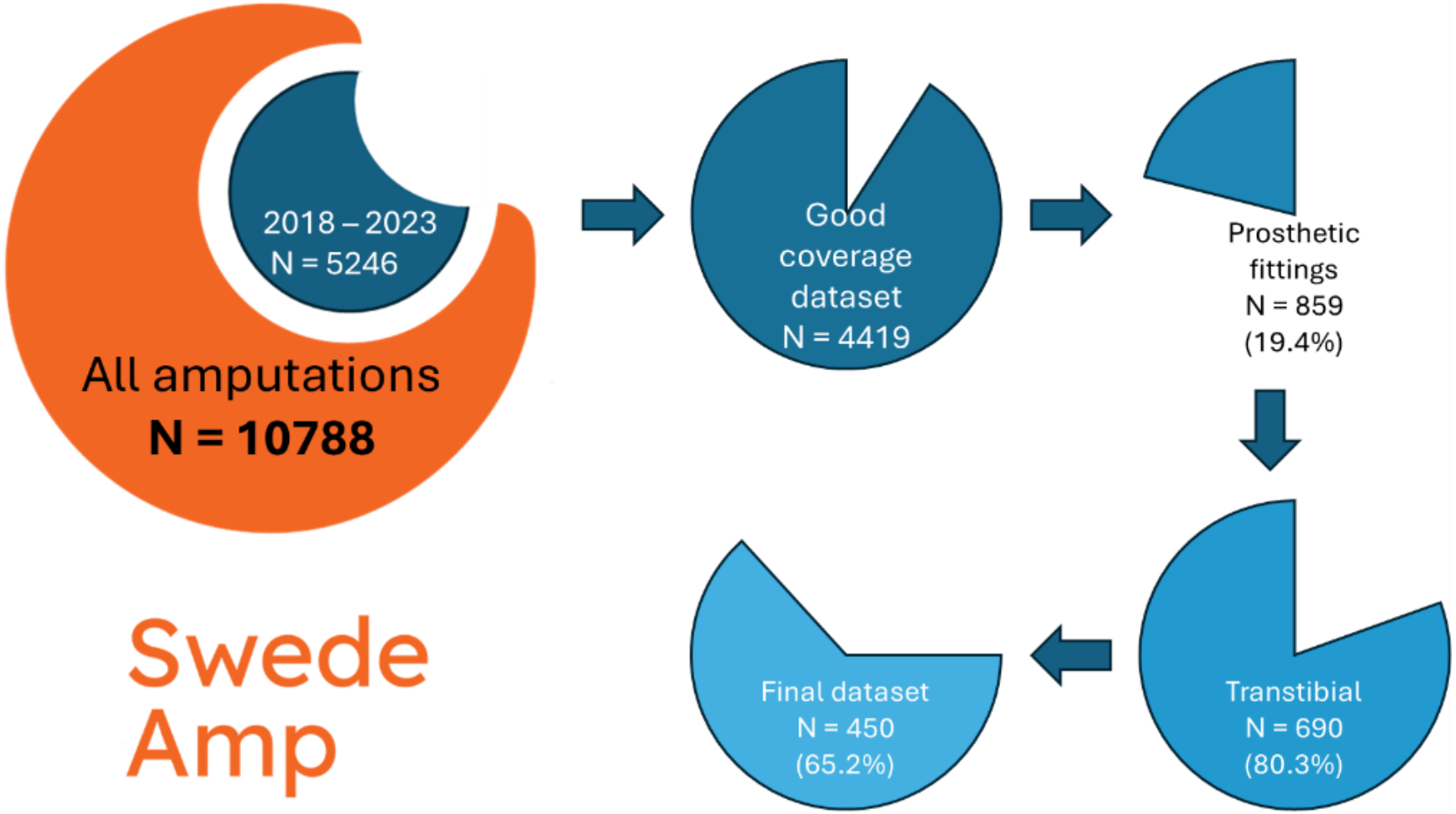
Timely prosthetic fittings are essential:

- Mobility,
- Independence,
- Long-term quality of life.

Yet surgical practices, post-op protocols, and prosthetic workflows differ widely

Is there an optimal path to early recovery after lower limb amputation ?

TT Incision Techniques and Postop Rehabilitation



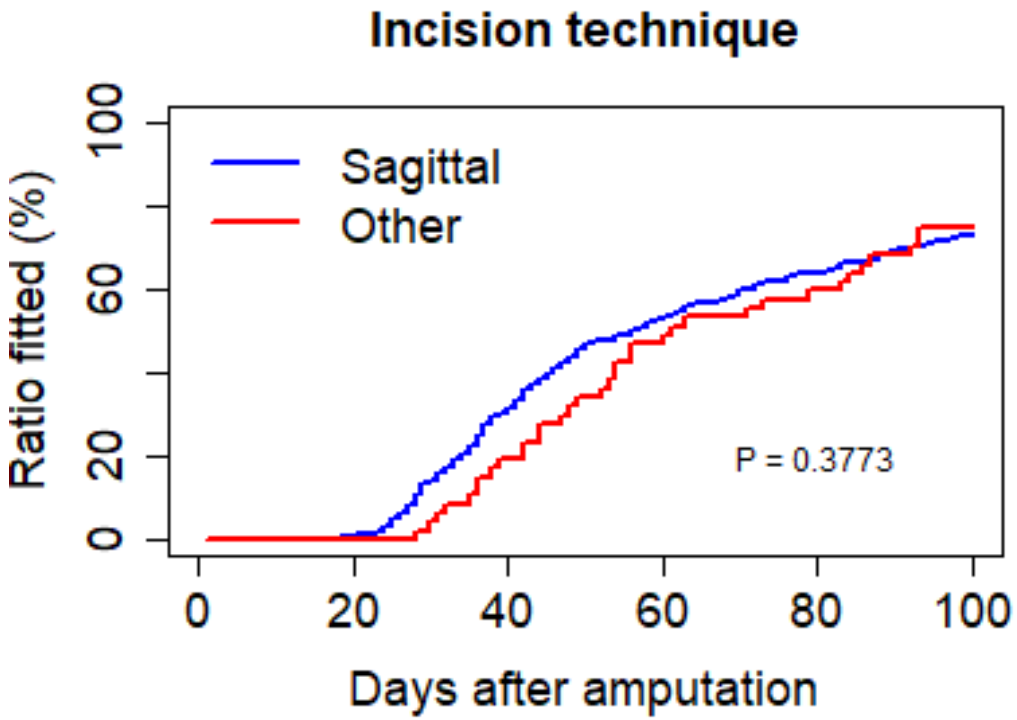
Swede Amp

Study Design

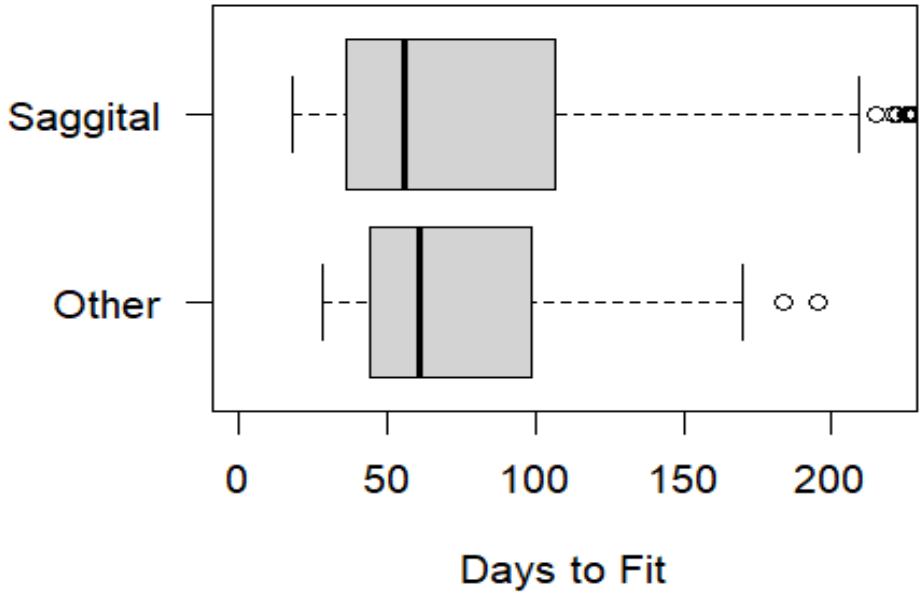
- Using the cohort of 450 TTA patients registered in the SwedeAmp database we investigated the effects of
  - Incision technique,
  - Compression type,
  - Compression initiation,
  - Socket fabrication method,
  - and other confounding variables.

- Time to prosthetic fit using time to event (survival) modeling

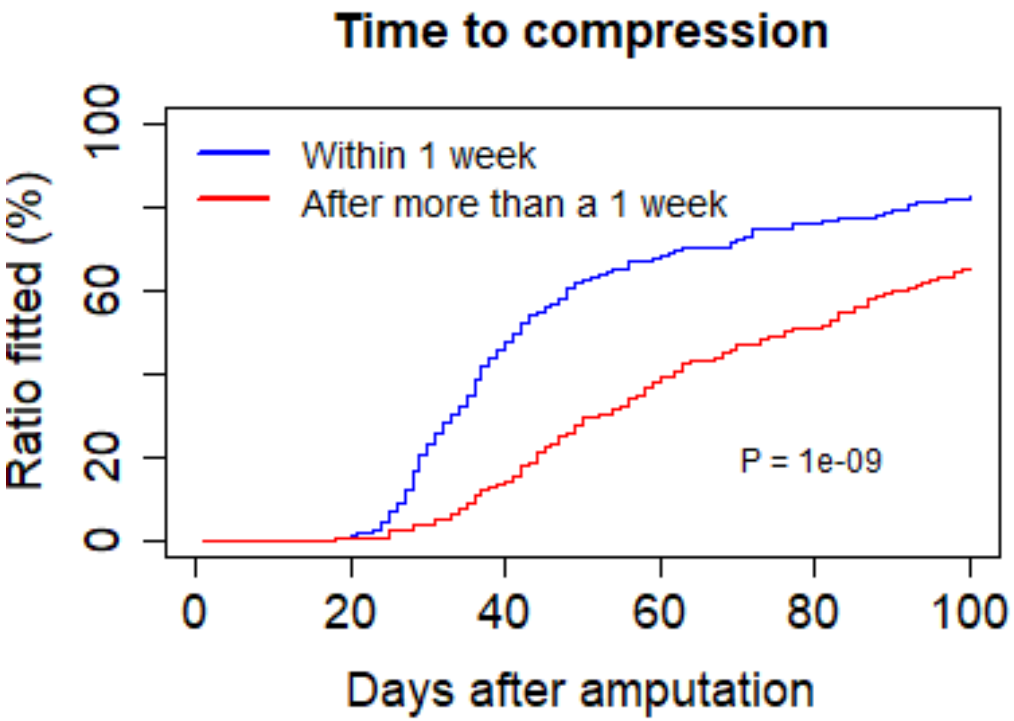
Incision technique



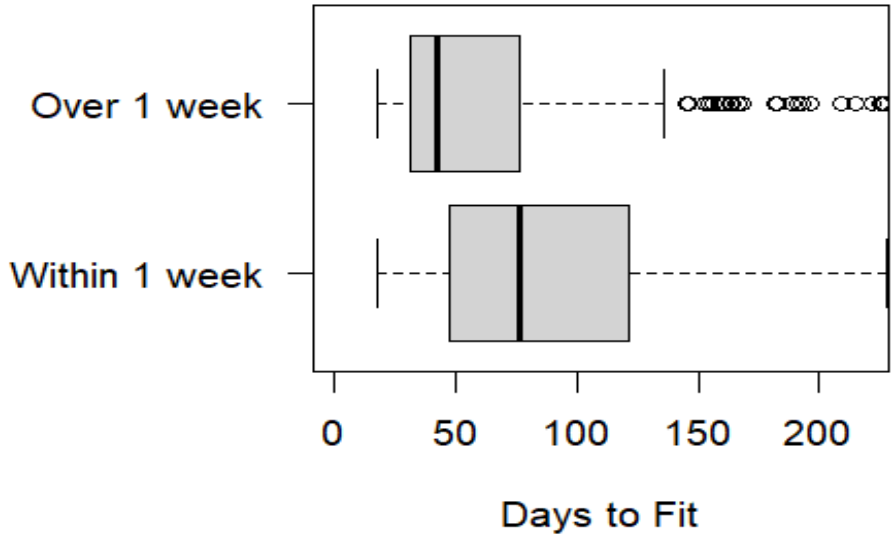
	N	Mean	SD	Median
Sagittal	403	84.2	70.4	56
Other	47	91.8	82.8	61



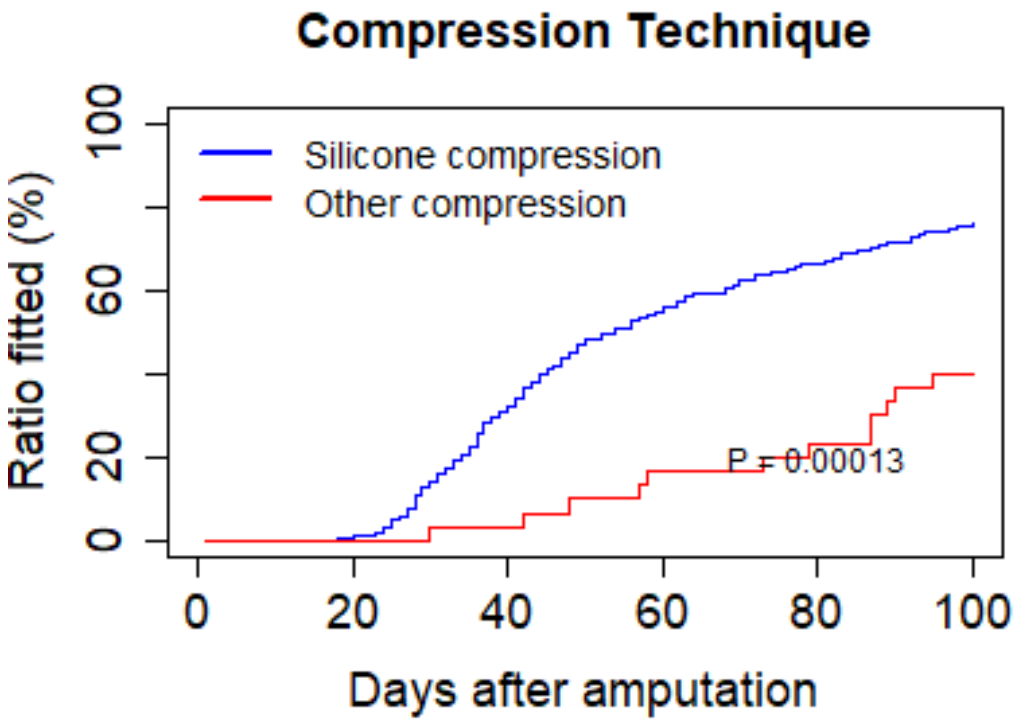
Time to Compression

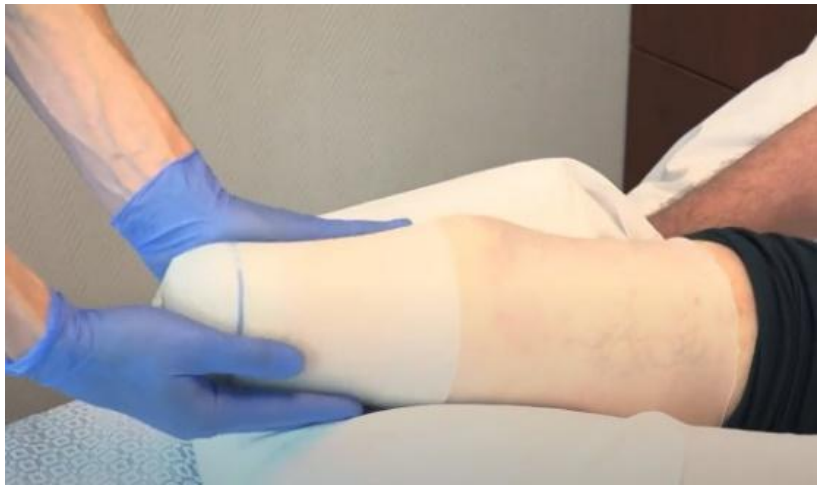


	N	Mean	SD	Median
Within 1 week	219	66.8	57.9	42
Over 1 week	231	102	79.1	76

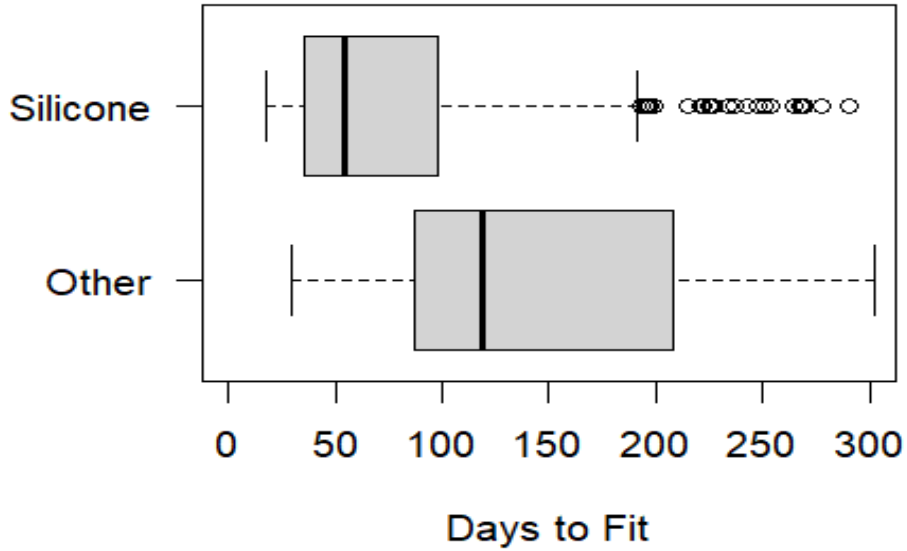


Compression Technique

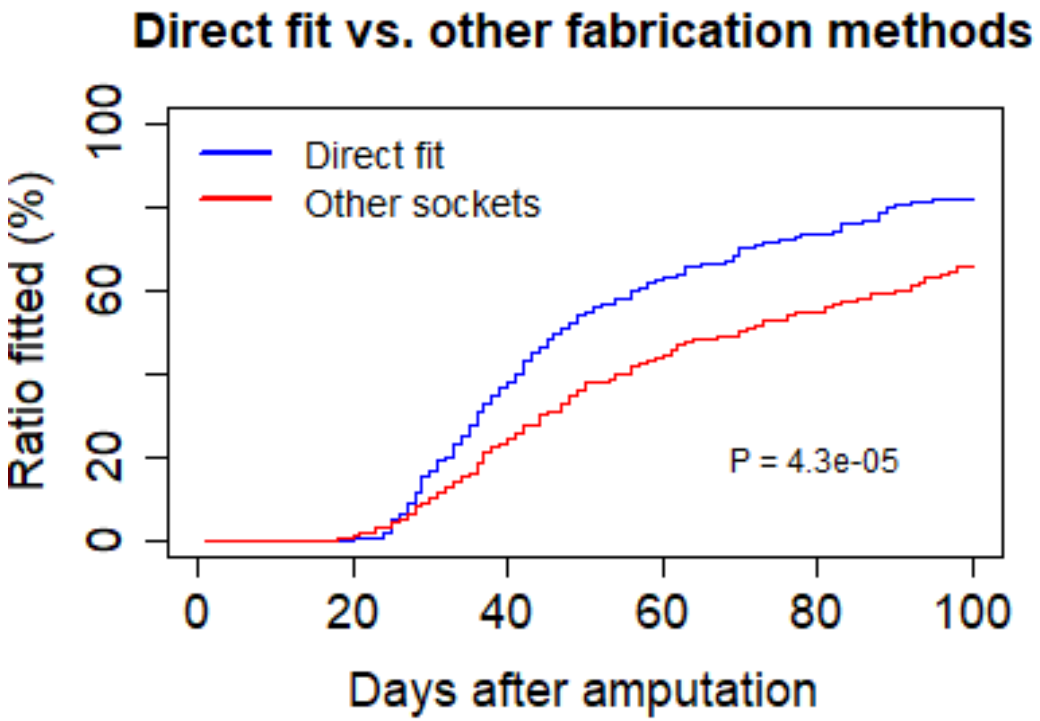




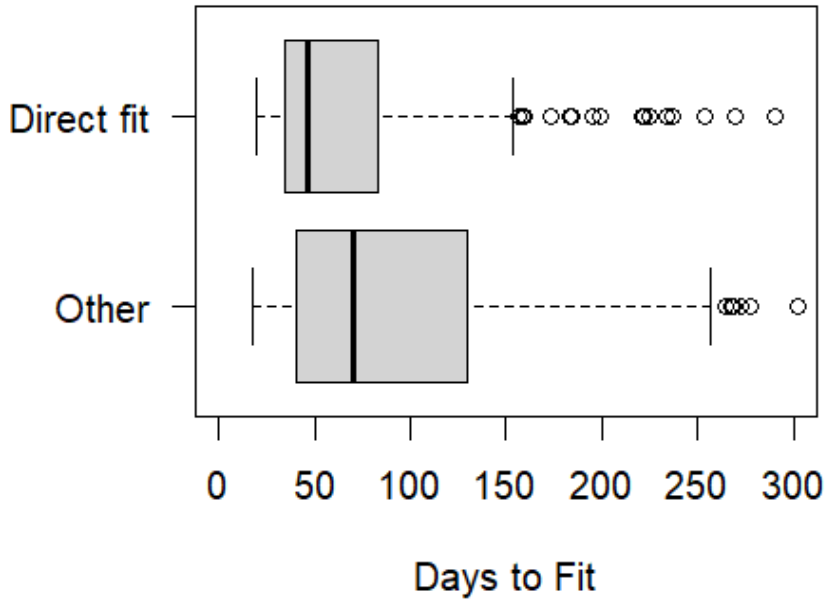
	N	Mean	SD	Median
Silicone	420	80.5	67.7	54
Other	30	148	95.9	119



Socket fitting methods



	N	Mean	SD	Median
Direct Fit	206	71.1	62.6	47
Other	244	96.7	76.8	70.5



Post-operative factors and days to fit

Incision technique	Time to Compression	Compression Technique	Socket fit	N	Mean	SD	Median
Sagittal	Within 1 week	Silicone	Direct Fit	108	50.9	37.3	37
			Other	89	77.1	65.8	45
		Other	Direct Fit	1	89.0		89
			Other	5	125.6	81.3	159
	Over 1 week	Silicone	Direct Fit	75	99.7	82.6	68
			Other	104	100.0	73.8	76
		Other	Direct Fit	6	87.7	51.5	74
			Other	15	163.3	77.9	119
Other	Within 1 week	Silicone	Direct Fit	2	54.0	2.8	54
			Other	14	103.4	88.1	66
	Over 1 week	Silicone	Direct Fit	14	68.4	45.3	45.5
			Other	14	76.1	38.7	61.5
		Other	Other	3	244.7	202.9	184

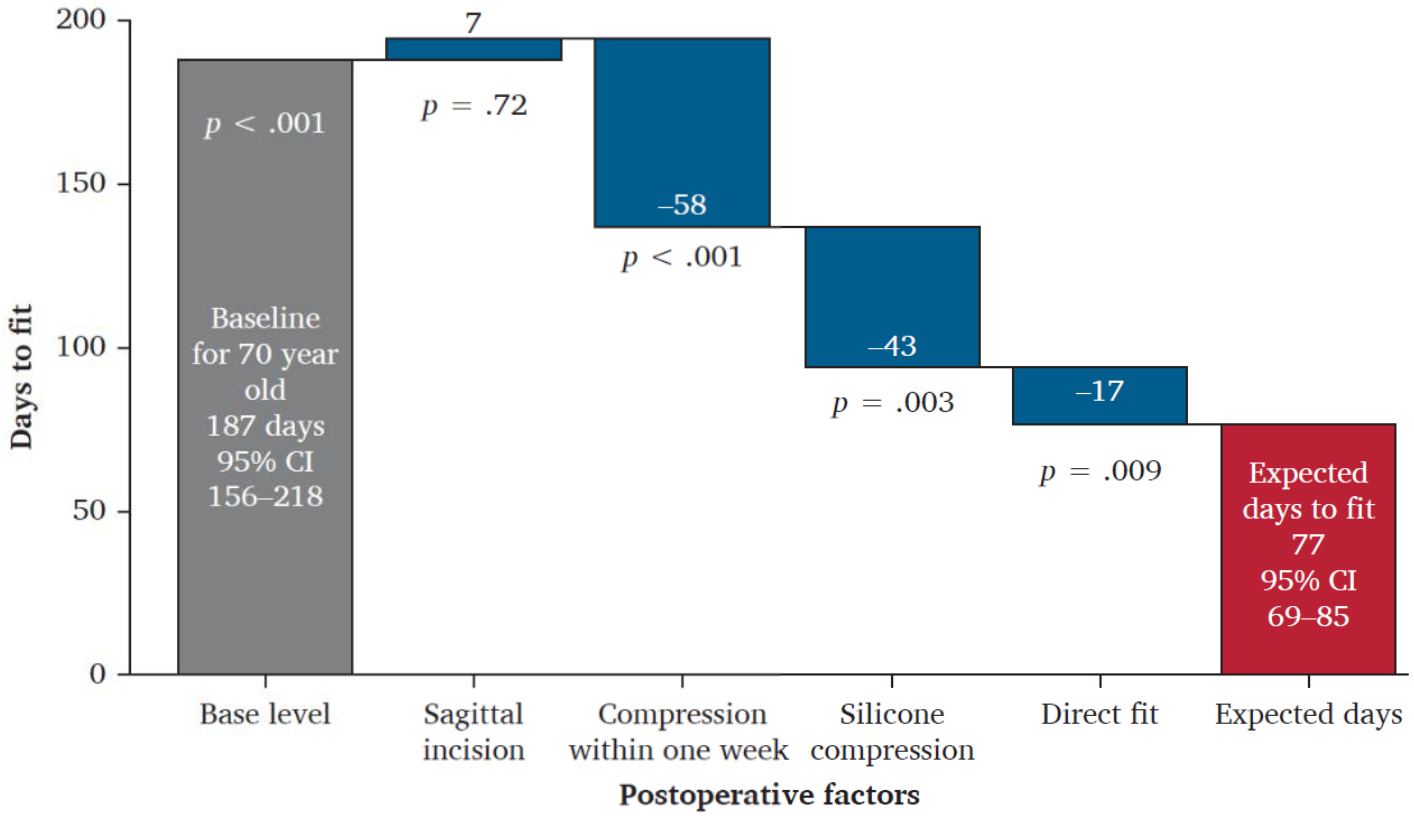
Time to event modeling

Incision / Post-Op effects	Time change (%)	p-value	
Incision technique, sagittal	+3.7%	0.72	
Post-op treatment, within 1 week	−29.8%	<0.001	***
Post-op compression, silicone	−31.6%	0.003	**
Socket fabrication method, direct fit	−17.8%	0.009	**

Demographic effects			
Sex, men	−5.2%	0.429	
Contralateral amputation	−19.5%	0.02	*
Age at amputation	+0.6% per year	0.009	**
Acute amputation	−34.5%	<0.001	***

Time to event modeling - Days to Prosthetic Fit

- Time-ratio for prosthetic fitting was influenced by
  - Surgery technique (NS)
  - Timing of compression therapy initiation ***
  - Use of silicone liners **
  - Socket production type **
  - Patient's age **
  - Previous contralateral amputation *
  - Whether reasons for amputations were due to chronic or acute reasons ***



p-values: (NS) > 0.05, * ≤0,05, ** ≤0,01 *** ≤0,001

Conclusion

- SwedeAmp data identified an optimal path to shortening the time to prosthetic fitting following TTA.
- The *sagittal incision* facilitates *early compression therapy* with a *silicone liner* and allows for *direct socket application*, which appears to significantly reduce time to fitting.

Does this reduction in time-to-fit lead to better outcomes for the patient?

Thank you for you attention!

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RESEARCH ARTICLE

EVALUATION OF THE SWEDEAMP DATABASE: FOCUS ON COVERAGE AND AMPUTATION LEVEL RATES

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Impact of Incision Technique and Post-operative Factors on Time to Prosthetic Fitting following Transtibial Amputation: A SwedeAmp Registry Study

Thor Fridriksson [a], Reynir Scheving [a], Karolin Lindgren Westlund [a], Benedikt þ. Sigurjónsson [a], Anton G. Johannesson

Questions ?

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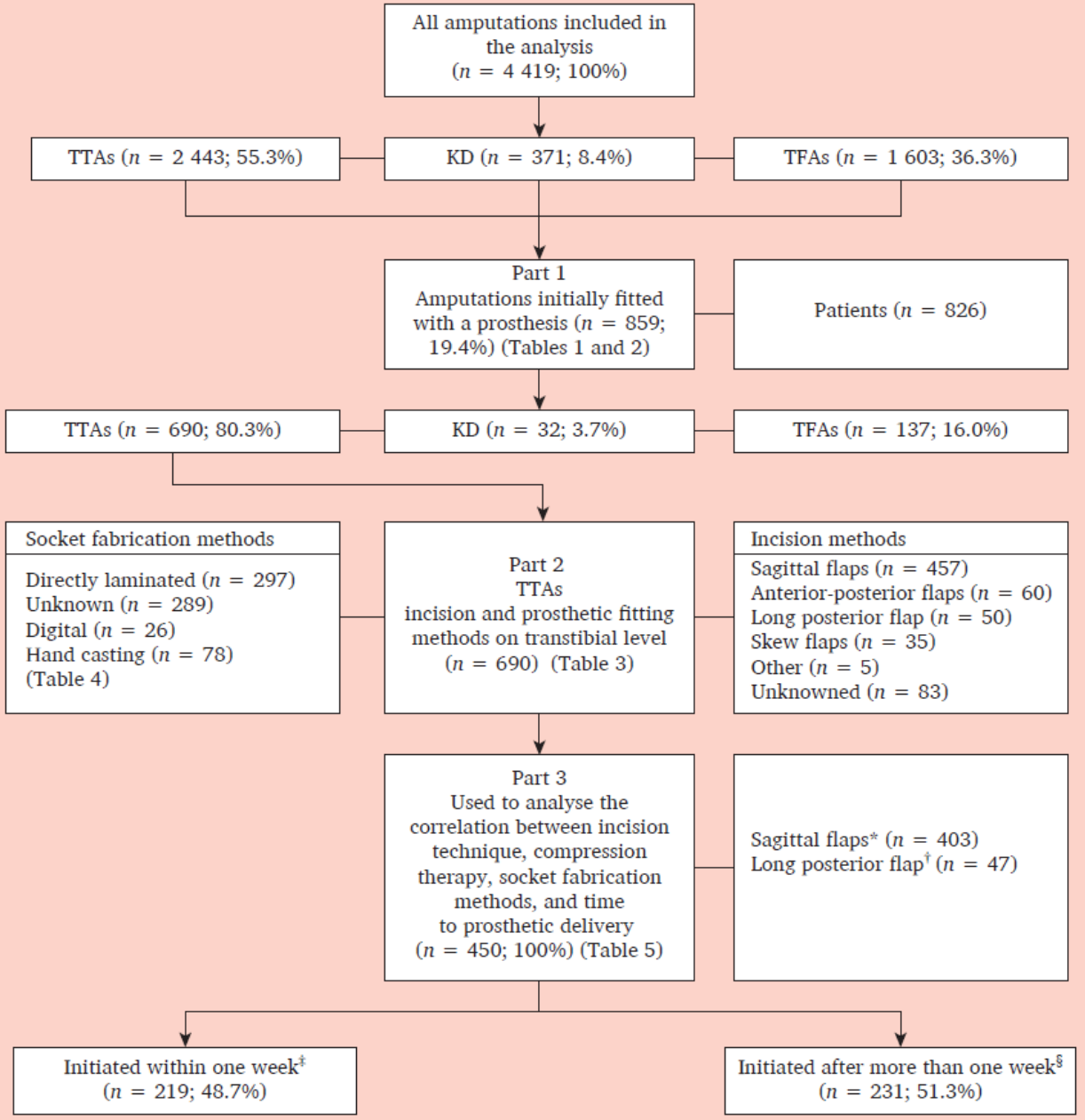
Figure 1: Flow diagram showing the number of amputations and levels included in the analysis



* 54 (9.9%) missing data
† 3 (6.0%) missing data
‡ 6 (2.7%) had other compression than silicone liner
§ 24 (10.4%) had other compression than silicone liner

Table 5. Time ratios of variables for receiving a prosthesis.

Variable	Time ratio (CI)	Time changes − %	Expected days (CI)	*p* value	Interpretation
Baseline	1 (1)	0	121 (74.6 − 196.3)	0*	
Sex, men	0.95 (0.83−1.08)	−5.2	−6.3 (−20.5 − 9.9)	.429	No significant effect of sex
Incision technique, sagittal	1.04 (0.85−1.26)	3.7	4.4 (−18 − 31.8)	.720	No significant effect of incision technique on prosthetic fitting
Post-op treatment, within 1 wk	0.7 (0.62−0.79)	−29.8	−36 (−45.8 − −24.9)	<.001*	Initiating the treatment within 1 wk significantly reduced the time to fitting by 30%
Post-op compression, silicone	0.68 (0.53−0.88)	−31.6	−38.3 (−56.6 − −14.8)	.003†	Silicone compression treatment decreased the time to fitting by 32%
Socket fabrication method, direct fit	0.82 (0.71−0.95)	−17.8	−21.5 (−35 − −5.9)	.009†	Using a directly laminated socket decreased the time to fitting by 18%
Contralateral amputation	0.8 (0.67−0.97)	−19.5	−23.6 (−39.8 − −4.1)	.020‡	Patients with a contralateral amputation were 20% faster to receive a prosthesis
COVID time§	0.75 (0.64−0.88)	−25.0	−30.2 (−43.7 − −14.3)	<.001*	During COVID, patients received prosthesis faster than before COVID
After COVID‖	1.16 (0.97−1.38)	15.5	18.8 (−3.6 − 45.4)	.110	After COVID, patients trended to receiving prosthesis slower (but not significantly) than before COVID
Age at amputation	1.01 (1−1.01)	0.6	0.8 (0.2 − 1.3)	.009†	Older patients received a prosthesis at a slower pace than younger ones, by roughly a half percentage point per additional year of age
Acute¶ amputation	0.65 (0.53−0.8)	−34.5	−41.7 (−56.3 − −23.9)	<.001*	Patients with acute reasons for amputations received a prosthesis 35% faster than those amputated due to chronic conditions

Table 2. Amputation level and demographics by sex (n = 859) receiving a prosthesis.

Sex	Women (n = 279)	Men (n = 580)	Total (n = 859)
Amputation level			
Transfemoral amputation	56 (20.1)	81 (14.0)	137 (15.9)
Disarticulation of knee	19 (6.8)	13 (2.2)	32 (3.7)
Transtibial amputation	204 (73.1)	486 (83.8)	690 (80.3)
Year			
2018	41 (14.7)	110 (19.0)	151 (17.6)
2019	60 (21.5)	118 (20.3)	178 (20.7)
2020	52 (18.6)	97 (16.7)	149 (17.3)
2021	42 (15.1)	90 (15.5)	132 (15.4)
2022	48 (17.2)	83 (14.3)	131 (15.3)
2023	36 (12.9)	82 (14.1)	118 (13.7)
Age at amputation − y			
Mean age ± SD	73.2 ± 13.6	70.9 ± 13.0	71.6 ± 13.3
Median age (min, max)	75.0 (22.0, 96.0)	73.0 (21.0, 98.0)	74.0 (21.0, 98.0)
Amputation side			
Left	130 (46.6)	283 (48.8)	413 (48.1)
Right	149 (53.4)	297 (51.2)	446 (51.9)
Condition leading to amputation			
Atherosclerosis without diabetes	101 (36.2)	103 (17.8)	204 (23.7)
Diabetes with or without vascular disease	107 (38.4)	358 (61.7)	465 (54.1)
Other peripheral vascular diseases without diabetes	16 (5.7)	20 (3.4)	36 (4.2)
Trauma	13 (4.7)	26 (4.5)	39 (4.5)
Tumour	10 (3.6)	11 (1.9)	21 (2.4)
Infection unrelated to diabetes or vascular disease	17 (6.1)	33 (5.7)	50 (5.8)
Other	15 (5.4)	29 (5.0)	44 (5.1)

Time-to-event model

Variable	Time ratio (CI)	Time changes − %	Expected days (CI)	*p* value	Interpretation
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Days to fit by socket fabrication method

Table 3. Days to prosthetic fitting following transtibial amputation and the associated socket fabrication method.

Fabrication method	*n* (%)	Mean days to fitting ± SD	Median	IQR*
Direct fit	297 (43.0)	82.1 ± 86	54.0	27, 81
Unknown	289 (41.9)	88.0 ± 67	65.0	26.5, 103.5
Digital	26 (3.8)	111.9 ± 56	95.5	68.1, 122.9
Hand casting	78 (11.3)	163.9 ± 101	135.0	62.75, 207.25

IQR = interquartile range; SD = standard deviation.

* IQR is represented as a range from 25 – 75%.