One screw, two screw, red screw, blue screw: a survey of the preferred methods of syndesmotic fixation used by South African orthopaedic surgeons

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Abstract

Background

Distal tibiofibular syndesmotic injuries account for up to 18% of ankle injuries which, if missed or poorly treated, can cause pain, prolonged recovery and even disability. International studies on syndesmotic injuries show a wide variation in treatment and surgical practice. Similar variation is suspected locally, yet South African management patterns remain poorly described. This study aims to describe current treatment practices for syndesmotic ankle injuries in South Africa and to determine whether these preferences differ by surgeon subgroup, experience, work sector or academic affiliation.

Methods

A national cross-sectional survey was conducted among orthopaedic surgeons, registrars and medical officers with ≥ 6 months of orthopaedic experience and ≥ 5 ankle open reduction and internal fixations (ORIFs) performed. An anonymous online questionnaire was distributed through the South African Orthopaedic Association (SAOA) and institutional networks.

Results

A total of 184 respondents participated; 84% were male (n = 157), with 44% (n = 81) aged 30–39 years, and 56% (n = 103) being consultants. Gauteng had the highest number of respondents at 51% (n = 93). Almost 99% (n = 181) had treated syndesmotic injuries in their practice. Screw fixation was preferred by government and earlier-career surgeons (54%, n = 80), whereas private sector and more senior surgeons (> 15 years) often used suture-button or hybrid constructs 44% (n = 65) ($p < 0.001$). Academic-affiliated surgeons more frequently used three-cortex fixation (87%, n = 100), vs 60% (n = 41) in non-academic surgeons ($p = 0.001$), and placed screws through a plate (94%, n = 108) vs 71% (n = 49) ($p = 0.001$). Fixation was usually placed 2–4 cm above the tibial plafond (79%, n = 123). Routine screw removal was more common among private, experienced surgeons, while government surgeons removed hardware only when indicated. Earlier-career/government surgeons were more likely to modify constructs in obese/diabetic patients, and in contrast to literature, very few surgeons (24%, n = 44) routinely fixed posterior malleolar fragments if smaller than 25%. Nearly all respondents (97%, n = 177) were willing to adjust practice based on new evidence.

Conclusion

Syndesmotic screw fixation predominates in government/early-career practice, whereas suture-button and hybrid methods are favoured in private/senior practice. Variation persists in fixation technique and hardware removal, but almost all surveyed surgeons indicated that they are willing to update their practices if high quality evidence is available.

Level of evidence: 4

Keywords: syndesmosis, ankle, suture-button, screw fixation, practice variation, South Africa, orthopaedics

Background

The ankle is among the most frequently injured joints in the human body.[1] In the general population of the United States, approximately one ankle sprain per 10 000 persons per day occurs, with substantially higher rates in athletes (16–21% of all sports injuries).[1-4] The distal tibiofibular syndesmosis, formed by the anterior-inferior tibiofibular ligaments (AITFL), posterior-inferior tibiofibular ligament (PITFL), interosseous ligament, and inferior transverse ligament, stabilises the ankle mortise, thus limiting external rotation, and axial and lateral talar displacement.[2,5-7] Even minimal malreduction (≈1 mm mortise change) can alter contact mechanics, risking pain, instability and even post-traumatic degeneration and arthritis.[5-7]

Syndesmotic injuries account for around 18% of ankle injuries, and prolonged recovery can occur up to 30 times more often when compared with simple lateral sprains.[3,6] Clinical diagnosis is challenging, with up to 20% of these injuries being missed initially, thus necessitating a high suspicion after external rotation and eversion injury mechanisms, and a careful use of clinical provocative tests in patients without acute fractures (external rotation stress, squeeze, crossed-leg).[5,6,8-12] Plain film radiographs (AP, lateral, mortise X-rays) assess the tibiofibular overlap/clear space and the medial clear space, although subtle diastasis can often be missed. Computed tomography (CT) studies improve detection of joint malreduction, while magnetic resonance imaging (MRI) remains the gold standard for detecting ligamentous injury in patients without acute fractures.[5,9,13-18]

Management of these injuries aims to restore anatomic alignment and permit biologic healing (ligament length, tensile strength, proprioception) to enable pain-free function and return to sport or daily activities.[8,10] Low-grade (West Point Grade 1) injuries may be treated non-operatively via staged protocols (protection/immobilisation and swelling control; progressive strengthening/proprioception; sport-specific reintegration).[19-21] Unstable or high-grade injuries generally require operative fixation.[8,20,21]

Surgical fixation options include trans- or supra-syndesmotic screws (varying in diameter/cortices, with/without plate/washer), dynamic suture-button devices, hybrid constructs, and posterior malleolus fixation where indicated.[5,20,22] Screws provide rigid stability initially but constrain physiologic motion and risk breakage if not removed. In contrast, suture-buttons, despite being more expensive, permit controlled micromotion, rarely require removal, and may be cost-competitive when secondary procedures are considered.[5,20,23,24] Recent meta-analyses report equal or superior functional outcomes and lower complication rates with suture-buttons compared with screws, though evidence continues to evolve.[24-28] Posterior malleolus fixation can improve syndesmotic stability and reduce malreduction, especially for larger or functionally unstable fragments.[29-32,34]

Despite maturing evidence internationally, there is no consolidated description of how South African (SA) surgeons currently diagnose and manage these injuries across sectors and experience levels. This study aims to address that gap.

Methods

We conducted a national, anonymous, cross-sectional online survey targeting SA orthopaedic consultants, registrars, and supervised medical officers with ≥ 6 months of orthopaedic exposure and ≥ 5 ankle ORIFs. Retired surgeons, those practising outside SA, and unsupervised medical officers were excluded. No exclusions were applied based on sex, race, age or other demographic parameters. Ethics approval was obtained, and informed consent obtained from all individual participants included in the study. Participation implied consent; anonymity and confidentiality were preserved.

An anonymous, online, Google Forms questionnaire (five minutes to complete; multiple choice format) was distributed via the South African Orthopaedic Association (SAOA) platform and to academic/hospital orthopaedic departments nationwide. Items captured included demographics (age, sex, role, years of experience, sector, academic affiliation), fixation strategies (device, cortices, diameter, level from plafond, through-plate usage), posterior malleolus fixation indications, hardware removal strategy, and treatment modifications for obesity/diabetes.

Using precision-based estimation for descriptive studies with 95% confidence, p = 0.15 and precision = 0.05 yielded a minimum n = 49. Data was analysed in RStudio. Descriptive data summarised overall patterns; between-group comparisons used Student's t-tests or Wilcoxon rank-sum for continuous variables and chi-squared/Fisher's exact tests for categorical variables (two-tailed, α = 0.05).

Results

Of 876 emails sent, we received a total of 184 complete responses (21% response rate). Most respondents were male (86%, n = 157) with females comprising 14% (n = 27). The largest age group was 30–39 years (44%, n = 81), followed by 40–49 years (27%, n = 49). Age was strongly associated with years of experience ($p < 0.001$); all respondents aged 20–29 years fell into the 0–5-year experience group, whereas almost all respondents aged ≥ 60 years were in the > 20-year group. Just over half (56%, n = 103) were orthopaedic consultants, with 27% (n = 50) registrars, and 16% (n = 29) medical officers. Years of experience ranged from 0–5 years (28%, n = 52), 6–10 years (28%, n = 57), and more than 20 years (19%, n = 35). As expected, qualifications were closely aligned with years of experience ($p < 0.001$) (*Table I*). With regard to practice setting, 53% (n = 97) worked exclusively in the government sector, 32% (n = 59) in private practice, and 15% (n = 28) across both. Sector distribution differed significantly by experience ($p < 0.001$) with almost all surgeons with 0–5 years' experience working in government sector (94%, n = 49), whereas the majority of those with > 20 years' experience were in private practice (68%, n = 24) or mixed practice (18%, n = 6), and only 15% (n = 5) government only. Nearly two-thirds of respondents reported being part of an academic university circuit (63%, n = 115) but this affiliation decreased with increasing experience ($p < 0.001$). Gauteng had the highest number of respondents at 51% (n = 93). The distribution of respondents across provinces differed significantly by years of experience ($p = 0.001$). Early-career surgeons (0–10 years) were predominantly based in Gauteng (74%, n = 69) followed by the Western Cape (45%, n = 16), whereas surgeons from other provinces (e.g. Limpopo, Mpumalanga, Free State, North West) were fewer in number and more often represented in the more experienced categories (more than ten years in orthopaedics) (59%, n = 19) (*Table II*).

Exposure to syndesmotic injuries was almost universal as around 99% (n = 181) had treated syndesmotic injuries. The preferred method of syndesmotic fixation varied significantly in the years of experience groups ($p < 0.001$). Overall, syndesmotic screw fixation alone was the most commonly reported method (44%, n = 80), but it predominated in earlier-career surgeons (64%, n = 32) of those with 0–5 years' experience and 50% (n = 28) with 6–10 years. In contrast, more experienced surgeons used a broader range of constructs. Among those with 16–20 years' experience, half favoured suture-button/tightrope devices (50%, n = 8), with only 19% (n = 4) using screw-only constructs. In the > 20-year group, suture-button/tightrope (32%, n = 11) and hybrid combinations (34%, n = 12) (e.g. screw plus suture-button or posterior malleolus fixation) were almost as frequent as screw-only fixation (29%, n = 10). Across all experience levels, purely posterior malleolus fixation without syndesmotic hardware was rare (1%, n = 2).

Among surgeons who used screw fixation, most reported using a single screw (68%, n = 105). Single-screw constructs were especially common among surgeons with 0–5 years' experience (84%, n = 43), whereas those with 16–20 or > 20 years' experience were more likely to use two screws (56%, n = 5, and 42%, n = 10, respectively). Three cortices of screw purchase were preferred in the majority overall (81%, n = 127), but the use of four cortices increased with experience ($p = 0.002$). Surgeons affiliated with academic institutions more often preferred the use of three cortices of screw purchase (87%, n = 100) vs non-academically affiliated (60%, n = 41) ($p = 0.001$), and chose to place screws through a plate (94%, n = 108) vs non-academically affiliated (71%, n = 49)

Table I: Description of orthopaedic surgeons performing ankle syndesmosis, based on years of experience

Variable	Category	Overall n = 184	0–5 years n = 52	6–10 years n = 57	11–15 years n = 25	16–20 years n = 16	> 20 years n = 34	p-value
Age								**< 0.001**
	20–29	15 (8%)	15 (29%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
	30–39	81 (44%)	34 (65%)	43 (75%)	4 (16%)	0 (0%)	0 (0%)	
	40–49	49 (27%)	3 (6%)	12 (21%)	19 (76%)	12 (75%)	3 (9%)	
	50–59	17 (9%)	0 (0%)	1 (2%)	2 (8%)	4 (25%)	10 (29%)	
	60–69	16 (9%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	16 (47%)	
	≥ 70	6 (3%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	5 (15%)	
Sex								0.080
	Female	25/183 (14%)	11 (21%)	10 (18%)	2 (8%)	1 (7%)	1 (3%)	
	Male	157/183 (86%)	41 (79%)	47 (82%)	22 (88%)	14 (93%)	33 (97%)	
	Prefer not to say/other	1/183 (1%)	0 (0%)	0 (0%)	1 (4%)	0 (0%)	0 (0%)	
Qualifications								**< 0.001**
	Community service doctor in orthopaedic dept (> 6 m)	2 (1%)	2 (4%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
	Medical officer (> 6 m)	29 (16%)	27 (52%)	1 (2%)	0 (0%)	0 (0%)	1 (3%)	
	Orthopaedic registrar	50 (27%)	21 (40%)	28 (49%)	1 (4%)	0 (0%)	0 (0%)	
	Specialist orthopaedic surgeon/consultant	103 (56%)	2 (4%)	28 (49%)	24 (96%)	16 (100%)	33 (97%)	
Sector								**< 0.001**
	Government	97 (53%)	49 (94%)	38 (67%)	4 (16%)	1 (6%)	5 (15%)	
	Private	59 (32%)	2 (4%)	12 (21%)	11 (44%)	11 (69%)	23 (68%)	
	Both	28 (15%)	1 (2%)	7 (12%)	10 (40%)	4 (25%)	6 (18%)	
Level of government hospital								**< 0.001**
	District hospital	2 (1%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)	
	Regional hospital	21 (11%)	12 (23%)	2 (4%)	2 (8%)	1 (6%)	4 (12%)	
	Tertiary/quaternary hospital	102 (55%)	37 (71%)	43 (75%)	12 (48%)	4 (25%)	6 (18%)	
	Not applicable	59 (32%)	2 (4%)	12 (21%)	11 (44%)	11 (69%)	23 (68%)	
Part of academic university circuit								**< 0.001**
	No	15/183 (8%)	6 (12%)	3 (5%)	0 (0%)	3 (19%)	3 (9%)	
	Not applicable	53/183 (29%)	1 (2%)	10 (18%)	11 (44%)	9 (56%)	22 (67%)	
	Yes	115/183 (63%)	45 (87%)	44 (77%)	14 (56%)	4 (25%)	8 (24%)	
Estimated annual ankle ORIF volume								**< 0.001**
	6–15	14 (8%)	11 (21%)	1 (2%)	1 (4%)	0 (0%)	1 (3%)	
	16–25	13 (7%)	8 (15%)	1 (2%)	2 (8%)	0 (0%)	2 (6%)	
	26–35	12 (7%)	6 (12%)	2 (4%)	2 (8%)	1 (6%)	1 (3%)	
	36–45	13 (7%)	6 (12%)	4 (7%)	2 (8%)	0 (0%)	1 (3%)	
	> 45	132 (72%)	21 (40%)	49 (86%)	18 (72%)	15 (93%)	29 (85%)	
Ever treated a syndesmotic injury								0.688
	No	1/182 (1%)	0 (0%)	1 (1.8%)	0 (0%)	0 (0%)	0 (0%)	
	Yes	181/182 (99%)	52 (100%)	55 (98%)	25 (100%)	16 (100%)	33 (100%)	
Preferred method of treatment of syndesmotic injury								**< 0.001**
Syndesmotic screw		80/183 (44%)	33 (64%)	28 (50%)	6 (24%)	3 (19%)	10 (29%)	
Suture-button or tightrope		38/183 (21%)	6 (12%)	9 (16%)	4 (16%)	8 (50%)	11 (32%)	
Posterior malleolus fixation alone		1/183 (1%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
Combination of syndesmotic screw and suture-button or tightrope		14/183 (8%)	1 (2%)	3 (5%)	6 (24%)	0 (0%)	4 (12%)	
Combination of syndesmotic screw and direct ligament repair		3/183 (2%)	1 (2%)	0 (0%)	0 (0%)	1 (6%)	1 (3%)	
Combination of suture-button or tightrope and direct ligament repair		8/183 (4%)	0 (0%)	0 (0%)	3 (12%)	2 (13%)	3 (9%)	

Combination of syndesmotic screw and posterior malleolus fixation	24/183 (13%)	8 (15%)	11 (20%)	1 (4%)	1 (6%)	3 (9%)	
Combination of suture-button or tightrope and posterior malleolus fixation	10/183 (6%)	1 (2%)	3 (5%)	3 (12%)	1 (6%)	2 (6%)	
Depends on the injury	5/183 (3%)	1 (2%)	2 (4%)	2 (8%)	0 (0%)	0 (0%)	
If screw fixation, number of screws							0.080
1	105/155 (68%)	43 (84%)	34 (63%)	10 (59%)	4 (44%4)	14 (58%)	
2	49/155 (32%)	7 (14%)	20 (37%)	7 (41%)	5 (56%)	10 (42%)	
3 or more	1/155 (1%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	
If screw fixation, number of cortices							**0.002**
3	127/156 (81%)	45 (88%)	46 (85%)	17 (94%)	6 (67%)	13 (54%)	
4	29/156 (19%)	6 (12%)	8 (15%)	1 (6%)	3 (33%)	11 (46%)	
If screw fixation, screw material							0.664
Stainless steel	63/156 (40%)	18 (36%)	20 (37%)	8 (42%)	5 (56%)	12 (50%)	
Titanium	88/156 (56%)	32 (64%)	32 (59%)	9 (47%)	4 (44%)	11 (46%)	
Bioabsorbable	2/156 (1%)	0 (0%)	1 (2%)	1 (5%)	0 (0%)	0 (0%)	
Other	3/156 (2%)	0 (0%)	1 (2%)	1 (5%)	0 (0%)	1 (4%)	
If screw fixation, location of screw							0.303
Screws inserted less than 2 cm from plafond	27/156 (17%)	10 (20%)	7 (13%)	2 (11%)	0 (0%)	8 (33%)	
Screws inserted 2–4 cm from plafond	123/156 (79%)	38 (75%)	45 (83%)	15 (83%)	9 (100%)	16 (67%)	
Screws inserted 4–6 cm from plafond	6/156 (4%)	3 (6%)	2 (4%)	1 (6%)	0 (0%)	0 (0%)	
If screw fixation, diameter of screw							0.107
3.5 mm	91/156 (58%)	36 (71%)	27 (50%)	10 (56%)	6 (67%)	12 (50%)	
4.0 mm	57/156 (37%)	13 (26%)	22 (41%)	7 (39%)	3 (33%)	12 (50%)	
4.5 mm	7/156 (5%)	2 (4%)	5 (9%)	0 (0%)	0 (0%)	0 (0%)	
Other	1/156 (1%)	0 (0%)	0 (0%)	1 (6%)	0 (0%)	0 (0%)	
If screw fixation, how to place screw							0.067
Through plate	138/156 (89%)	48 (94%)	51 (94%)	12 (67%)	7 (78%)	20 (83%)	
Not through plate but with a washer	7/156 (5%)	3 (6%)	0 (0%)	2 (11%)	1 (11%)	1 (4%)	
Screw alone, without a washer	9/156 (6%)	0 (0%)	2 (4%)	3 (17%)	1 (11%)	3 (13%)	
Other	2/156 (1%)	0 (0%)	1 (2%)	1 (6%)	0 (0%)	0 (0%)	
Do you routinely fix the posterior malleolus							**0.034**
No	31/183 (17%)	9 (17%)	5 (9%)	4 (16%)	4 (25%)	9 (27%)	
Yes, always	44/183 (24%)	10 (19%)	21 (38%)	5 (20%)	4 (25%)	4 (12%)	
Yes, if the posterior fragment is more than 25% of the joint surface	89/183 (49%)	27 (52%)	22 (39%)	11 (44%)	8 (50%)	21 (62%)	
Other	19/183 (10%)	6 (12%)	8 (14%)	5 (20%)	0 (0%)	0 (0%)	
Do you routinely remove syndesmotic fixation							**0.015**
Yes	33/178 (19%)	1 (2%)	9 (16%)	6 (27%)	4 (25%)	13 (39%)	
No	78/178 (44%)	26 (51%)	27 (48%)	7 (32%)	6 (38%)	12 (36%)	
Only if symptomatic	54/178 (30%)	18 (35%)	17 (30%)	8 (36%)	5 (31%)	6 (18%)	
Only if signs of infection	9/178 (5%)	6 (12%)	1 (2%)	1 (5%)	1 (6%)	0 (0%)	
Only if screws break	1/178 (1%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	
Other	3/178 (2%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)	2 (6%)	
Does your choice of treatment for syndesmotic injury change if the patient is obese?							**0.011**
No	97/182 (53%)	17 (33%)	28 (49%)	14 (56%)	13 (81%)	25 (76%)	
Yes, more likely to choose non-operative treatment	3/182 (2%)	2 (4%)	1 (2%)	0 (0%)	0 (0%)	0 (0%)	
Yes, more likely to minimally invasive treatment method	3/182 (2%)	2 (4%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)	
Yes, more likely to add more screws or more cortices	77/182 (42%)	30 (59%)	27 (47%)	11 (44%)	2 (13%)	7 (21%)	
Other	2/182 (1%)	0 (0%)	1 (2%)	0 (0%)	1 (6%)	0 (0%)	
Does your choice of treatment for syndesmotic injury change if the patient is diabetic							**< 0.001**
No	86/182 (47%)	21 (40%)	13 (23%)	10 (40%)	13 (81%)	29 (88%)	
Yes, more likely to choose non-operative treatment	8/182 (4%)	3 (6%)	3 (5%)	1 (4%)	0 (0%)	1 (3%)	

Yes, more likely to minimally invasive treatment method	9/182 (5%)	5 (10%)	1 (2%)	2 (8%)	1 (6%)	0 (0%)	
Yes, more likely to add more screws or more cortices	78/182 (43%)	23 (44%)	39 (70%)	12 (48%)	1 (6%)	3 (9%)	
Other	1/182 (1%)	0 (0%)	0 (0%)	0 (0%)	1 (6%)	0 (0%)	
Why do you choose to treat syndesmotic injuries in the manner you do							**< 0.001**
This is the best scientific or evidence-based method	62/183 (34%)	13 (25%)	27 (47%)	10 (40%)	5 (31%)	7 (21%)	
This is the best method from my own clinical experience	43/183 (24%)	2 (4%)	7 (12%)	8 (32%)	9 (56%)	17 (52%)	
This is the method I was taught	55/183 (30%)	32 (62%)	15 (26%)	2 (8%)	0 (0%)	6 (18%)	
This is the most cost-effective method	14/183 (8%)	2 (4%)	5 (9%)	3 (12%)	1 (6%)	3 (9%)	
This is the only option available to me in my setting	7/183 (4%)	3 (6%)	3 (5%)	1 (4%)	0 (0%)	0 (0%)	
Other	2/183 (1%)	0 (0%)	0 (0%)	1 (4%)	1 (6%)	0 (0%)	
Would you be willing to change your choice of treatment if there is good evidence to prove another method works better							0.082
No	6/183 (3%)	0 (0%)	2 (4%)	3 (12%)	0 (0%)	1 (3%)	
Yes	177/183 (97%)	51 (100%)	55 (97%)	22 (88%)	16 (100%)	33 (97%)	

Table II: Province of practice stratified by years of experience

Province	Overall n (%)	0–5 years (n = 52)	6–10 years (n = 57)	11–15 years (n = 25)	16–20 years (n = 16)	> 20 years (n = 34)	p-value
Gauteng	93 (51)	30 (58)	39 (68)	7 (28)	5 (31)	12 (35)	0.001
Western Cape	35 (19)	7 (14)	9 (16)	8 (32)	3 (19)	8 (24)	
KwaZulu-Natal	24 (13)	7 (14)	4 (7)	5 (20)	2 (13)	6 (18)	
Limpopo	6 (3)	4 (8)	1 (2)	0 (0)	0 (0)	1 (3)	
Mpumalanga	2 (1)	0 (0)	0 (0)	0 (0)	1 (6)	1 (3)	
Eastern Cape	11 (6)	1 (2)	3 (5)	4 (16)	2 (13)	1 (3)	
North West	7 (4)	3 (6)	0 (0)	1 (4)	0 (0)	3 (9)	
Free State	6 (3)	0 (0)	1 (2)	0 (0)	3 (19)	2 (6)	

(p = 0.001). Fixation was usually placed 2–4 cm above the tibial plafond (79%, n = 123) for most surgeons.

Non-academic respondents showed a stronger preference for 3.5 mm screws (91%, n = 61), whereas academic respondents used a wider range (p = 0.046).

Almost half of the respondents (49%, n = 89), in contrast to the latest literature, favoured fixation only when the posterior malleolar fragment exceeded 25% of joint surface. This '> 25% fragment' criterion was reported across all experience groups and was particularly frequent among surgeons with > 20 years' experience (62%, n = 21). A smaller group (17%, n = 31) indicated that they do not routinely fix the posterior malleolus, with this option more frequently selected among the most experienced surgeons (27%, n = 13) in the > 20-year group compared with early-career surgeons.

Routine removal of syndesmotic fixation differed significantly by years of experience (p = 0.015) and sector (p = 0.003). Early-career (0–5 years) surgeons rarely removed screws (2%, n = 1) routinely, while > 20 years surgeons were much more likely to perform routine removal (39%, n = 13), with only 36% (n = 12) reporting 'no routine removal' and 18% (n = 6) choosing symptom-driven removal. Government surgeons predominantly avoided routine removal (52%, n = 50), whereas private surgeons tended to lean toward routine (34%, n = 20) or symptom-driven removal (25%, n = 15).

For obese patients, over half (53%, n = 97) of the surgeons would not change their construct. The proportion choosing 'no change' rose with experience (33%, n = 17) in 0–5 years to 81% (n = 13) in > 20 years; p = 0.011). Among those modifying constructs (42%, n = 77), earlier-career surgeons more commonly added more screws/cortices (59%, n = 30) in 0–5 years; 47% (n = 27) in 6–10 years, versus 21% (n = 7) in > 20 years. Patterns for diabetes were similar, with government surgeons being more likely to increase screw number/cortices in diabetics (56%, n = 54) compared to private (23%, n = 13) (p = 0.001).

Around 97% (n = 177) of respondents indicated willingness to change practice if higher-level evidence supported alternative approaches. Willingness to change did not differ significantly by years of experience (p = 0.082), although the small number of respondents who were unwilling to change was concentrated in the 6–15-year experience groups (n = 5).

Discussion

Key findings in context

This is, to our knowledge, the largest SA survey of syndesmotic injury management across both public and private sectors (n = 184), with 53% (n = 93) based in government hospitals only and 63% (n = 115) having an academic affiliation. Gauteng, with its three orthopaedic training universities, unsurprisingly had the highest number of respondents at 51% (n = 93). The distribution of early-career surgeons (0–10 years) predominantly being based in Gauteng (74%, n = 69) is also likely due to the high number of training facilities in the province. We demonstrate clear, clinically meaningful practice heterogeneity across experience, sector, and academic involvement.

Construct choice diverges by sector and seniority

Government and earlier-career surgeons (< 10 years of experience) favour screws; private and late-career surgeons (> 10 years of experience) more often adopt suture-buttons. This mirrors international trends toward dynamic fixation in resource-rich systems and even hybridisation where appropriate.[24-28] In SA,

variation likely reflects resource availability, implant costs, theatre logistics and device familiarity.[35]

Technical nuance varies with academic affiliation

Academic surgeons more frequently use three cortices and screw-through-plate placement, but have varying screw diameter preferences – potentially reflecting institutional protocols, teaching culture, and exposure to evolving evidence/technique.

Posterior malleolus fixation thresholds are higher than in modern literature

Nearly half of the respondents set a hard threshold at fixation only if there is > 25% articular involvement. However, contemporary evidence stresses that functional instability and syndesmotic contribution, not just fragment percentage size, should inform fixation; and stabilising even smaller fragments may improve reduction quality and decrease syndesmotic malreduction.[29,30,32-34]

Hardware removal strategies split by sector and experience

Private/more experienced surgeons leaned toward routine removal, diverging from literature that supports on-demand removal in the absence of symptoms or planned return-to-impact sport under rigid constructs.[5,18,36] Potential reasons for this may include medicolegal culture, patient preference, insurance structures and/or perceptions of breakage risk, as well as the potential that government surgeons may have limited access to theatre time compared to private surgeons due to the higher patient load or limited resources.[30]

Approach to obesity/diabetes differs by experience/sector

Earlier-career/government surgeons more often escalate rigidity (additional screws/cortices). While neuropathy, soft-tissue risk, and loss of reduction are genuine concerns, best practice guidelines such as the British Orthopaedic Association Standards for Trauma (BOAST), emphasises meticulous reduction and stable, but not over-rigid, constructs. They also place emphasis on perioperative optimisation (glycaemic control, soft-tissue management) rather than a default to 'more metal.'[5,28,37]

Collectively, these trends sketch a South African landscape where evidence evolution and resource realities intersect. Screws remain indispensable, being cost-effective, familiar and widely available, but dynamic fixation is gaining traction where feasible.[38] International meta-analyses increasingly report equal or improved functional outcomes and fewer complications with suture-buttons, including earlier weight-bearing and lower malreduction, though high-quality randomised controlled trial (RCT) data continue to accumulate.[24-27,39] A local retrospective cohort study in KwaZulu-Natal showed the suture-button fixation for the treatment of syndesmotic injuries is both safe and effective, with good patient reported outcomes and a low complication rate.[40] Our respondents' 97% willingness to adapt to new evidence is a vital springboard for potential national alignment of consensus in the treatment of syndesmotic injuries.

Clinical applications and suggestions

Diagnosis: Maintain high suspicion in external rotation/eversion mechanisms; use combined clinical stress tests and appropriate imaging. Where available, CT for malreduction and MRI for ligament integrity (not required in acute fracture setting) can refine decision making.[5,8-10,13-15,17,18]

Fixation choice: Screws remain appropriate where cost/availability dominate; consider 3.5–4.5 mm diameters with three or four cortices depending on removal plans and plate use.[5,20] Suture-buttons offer dynamic stabilisation, lower re-operation likelihood, and cost-competitiveness once removals are considered.[23,24,26-28] Hybrid strategies (screw + button, or posterior malleolus fixation) can target stability while respecting physiologic motion.[29,30,32,33]

Posterior malleolus: Move beyond a fixed size threshold; fix fragments that contribute to instability or where fixation improves syndesmotic reduction, even when < 25%.[29,30,32,33]

Hardware removal: Favour selective (on demand) removal, aligned with symptomatology and activity profile, particularly where dynamic constructs are used.[36]

Special populations: In obesity/diabetes/neuropathy, prioritise anatomic reduction, stable constructs, soft-tissue stewardship, and perioperative glucose control; avoid reflex escalation to 'more screws' without addressing biology and rehabilitation.[5,28,37]

The strengths of this study include a large national sample spanning public/private sectors, wide experience bands, and high academic representation, which mitigate single-system bias and illuminate system-level effects. Limitations include inherent survey biases (self-report, selection, recall), uneven provincial representation (not reported here), and absence of patient-level outcomes. Due to the distribution methods used for the survey, there may be some inherent bias as only surgeons that belong to the SAOA or are a part of academic networks have been surveyed. We did not formally evaluate diagnostic imaging preferences in detail (e.g., CT access), nor did we capture implant procurement constraints per institution.

Future research and policy directions

1. *Prospective comparative studies* in South African settings (screws vs suture-buttons vs hybrid; routine vs selective removal) with functional, radiographic, cost, and re-operation endpoints, double-blinded and randomised controlled if possible. However, these studies can be laborious and expensive to conduct so perhaps extrapolation from high quality international studies may be more economical.
2. *Consensus development* (SAOA/university academic units) on minimum standards: reduction verification (including intraoperative imaging strategies), posterior malleolus fixation indications, and screw/button selection.
3. *Health–economic evaluations* calibrated to SA procurement realities, including costs of removals, clinic visits, and time to weight-bearing/return to work.
4. *Training interventions* to harmonise techniques across experience bands and sectors, leveraging the high stated willingness (97%) to adopt evidence-based change.

Conclusion

In South Africa, fixation strategies for syndesmotic injuries show systematic variation by experience, sector and academic affiliation. Government/early-career practice remains screw-dominant, while private/late-career practice more often incorporates suture-button or hybrid constructs. Technical parameters (cortices, plate-through screws, diameter), posterior malleolus thresholds, and hardware removal protocols also vary. Almost all surveyed surgeons indicated that they are willing to update their practices if high quality evidence is available.

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Ethics statement

The authors declare that this submission is in accordance with the principles laid down by the Responsible Research Publication Position Statements as developed at the 2nd World Conference on Research Integrity in Singapore, 2010. Prior to the commencement of the study ethical approval was obtained from the following ethical review board: University of the Witwatersrand HREC (Medical) MED23-10-305. All procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed written consent was obtained from all patients for being included in the study.

Declaration
The authors declare authorship of this article and that they have followed sound scientific research practice. This research is original and does not transgress plagiarism policies.

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