



Management of distal tibio-fibular syndesmotic injuries : A snapshot of current practice

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Management of syndesmotic injuries of the ankle remains controversial. A postal questionnaire was administered to 310 Orthopaedic consultants in the United Kingdom to explore these issues. One hundred and ninety seven (63.55%) replies were received. A large number of surgeons use intra-operative hook test as an aid to assess syndesmotic stability (68.8%). A clear majority favoured the use of a syndesmotic screw as the preferred method of fixation (97.4%). The opinion on technique was divided over issues including number of cortices fixed, position and type of screw used. Most surgeons (88.4%) do not compress the syndesmosis while inserting the screw. Very few surgeons (8.5%) allow full weight bearing immediately after surgery. The survey establishes an overview of current practice of management of syndesmotic ankle injuries.

Keywords : ankle fracture ; syndesmosis ; postal questionnaire.

INTRODUCTION

Disruption of the inferior tibiofibular syndesmosis is most commonly associated with ankle fractures but may also occur without gross bony injury. The management of these injuries remains controversial (32). There is controversy in the choice between metal and bio absorbable screws, screw size, number of cortices fixed, and the post-operative management (18).

There have been recent challenges to conventional wisdom and common practice. Kennedy *et al* (13) have recently questioned the need for syndesmotic screw fixation in certain low fractures. There is little published work providing a broad look at actual practices. Continued debate regarding the diagnosis, technical aspects of management and post-operative management protocols led us to design this survey aiming to obtain an overview of current practice.

MATERIALS AND METHODS

A questionnaire was developed with the aim to seek opinion from consultant orthopaedic surgeons on their practice of diagnosis and management of syndesmotic ankle injuries. The design of the questionnaire was based on literature review of current controversies in this area.

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Table I. — Questionnaire sent and responses received

	Number (n)	Percentage(%)
How do you check for inferior tibio-fibular diastasis ?		
X-ray diagnosis pre-op	34	18
Rotation-stress views intra-op	5	2.6
'Hook test'	24	12.7
X-Ray + Stress views	19	10.1
X-Ray + Hook test	63	33.3
Hook test + Stress Views	1	0.5
X-Rays + Hook Test +Stress Views	43	22.8
In case of ankle fractures with inferior tibio-fibular diastasis do you		
Use syndesmosis screw	184	97.4
K-wire fixation	0	0
Suture fixation	0	0
Use no fixation at all	1	0.5
Screw + Suture	3	1.6
Other [Hook(n = 1)]	1	0.5
If you use a syndesmosis screw, do you place it-		
(i) Cortices fixed		
Across 3 cortices	111	58.7
Across 4 cortices	64	33.9
No response	14	7.4
(ii) Position of screw		
2 cm above joint line	107	56.6
4 cm above joint line	48	25.4
No Response	34	18
(iii) Type of screw		
Use small fragment screw	95	50.3
Large fragment screw	61	32.3
No response	33	17.5
If you use a syndesmosis screw, do you compress the joint (lag it) ?		
Yes	20	10.6
No	167	88.4
No Response	2	1.1
If you use a form of syndesmotic fixation, do you (immediate post-op)		
Allow no weight bearing	138	73
Allow partial weight bearing	31	16.4
Allow full weight bearing	16	8.5
No response	4	2.1
When do you remove the syndesmotic screw ?		
Only if symptomatic	19	10.1
Before allowing full weight-bearing	158	83.6
Do not remove routinely	7	3.7
No response	5	2.6

Three hundred and ten consultants practicing in the West Midlands and Trent region in the United Kingdom were requested to complete and return a short postal questionnaire (table I). They were asked about their standard practice regarding diagnosis and management of ankle injuries with syndesmosis disruption.

Of the 310 questionnaires sent out, 197 were returned following a single mail request. Although the survey was posted to surgeons working in hospitals with emergency services, eight respondents were no longer involved in trauma and did not complete the questionnaire. One hundred and eighty nine replies (60.97%) were available

to be included in the analysis. Some of the consultants chose not to respond to certain parts of the questionnaire ; the results are presented separately for each question. More than one choice was allowed for each question. A figure of 85% was chosen to represent a majority (27).

RESULTS

A summary of the results is presented in table I. The Hook test is used by 69.3% of the respondents, either alone or in combination with pre-operative radiographs and/or EUA for determination of syndesmotic injury. The rest of the surgeons (30.7%) rely on pre-operative radiographs and / or stress views for making the diagnosis.

A majority of the surgeons (97.4%) prefer the use of only a syndesmotic screw for syndesmosis stabilisation. One surgeon used a "hook" for fixation (this could not be clarified further as the responses were anonymous) and one preferred no fixation. Although most consultants (58.7%) prefer to engage three cortices with the syndesmotic screw, a significant number (33.9%) engage four cortices. The position of the screw in relation to the distance above the joint line did not elicit a consensus response either, with 56.6% respondents choosing 2 cm above the joint line and 25.4% selecting 4 cm above the joint. Eighteen percent did not respond to this question however. A greater number of surgeons use small fragment (3.5 mm) (50.3%) than large fragment (4.5 mm) (32.3%) screws. A majority of the surgeons (88.4%) do not like to compress the joint (lag) during the use of a syndesmosis screw.

Although there was no clear mandate for a common postoperative management plan, the greatest numbers of surgeons (73%) tend to keep their patients "non weight bearing". Only 8.5% respondents allow full weight bearing mobilisation immediately after surgery. Routine removal of the syndesmotic screw is advocated by 83.6% of the respondents, who aim to remove it prior to full weight bearing.

DISCUSSION

Unstable ankle fractures frequently need internal fixation to achieve and maintain anatomical reduc-

tion and to allow early mobilisation (10). Reduction of the syndesmosis has been described as one the most important predictors of functional outcome (31). Current indications for syndesmosis fixation are based on tibiotalar joint mechanics studied in cadavers and from biomechanical studies, radiological evaluation and better understanding of the aetiology of such injuries. Clear-cut recommendations on fixation remain elusive (32), even though there is evidence that improper application of syndesmotic screw could lead to joint damage (20).

It has been long since recognised that disruption of the inferior tibiofibular joint may not be radiologically evident (7) and may be recognised only during surgery or examination under anaesthesia. This has been confirmed clearly in recent work using MR imaging to delineate the syndesmosis (24). It is interesting to note that 18% of the respondents still use only plain radiographs as the method of diagnosing such injuries. Following the work of Yablon *et al* (33) the importance of fibular stability was recognised as a key factor in achieving good outcome following ankle fractures with syndesmotic disruptions. This has been the rationale for applying the "hook" test following fibular fixation. Close to 70% of the respondents used this to determine integrity of the syndesmosis intra-operatively.

A screw transfixing the distal tibiofibular joint is the preferred method of treatment of such injuries (10,12,23,31) though alternative methods like K-wire fixation have been described (26). It is evident from our survey that a clear majority (97.4%) of the trauma surgeons favour the use of a syndesmotic screw.

The rationale behind using a screw through only three cortices stems from a desire to avoid compression at the syndesmosis, which is likely if four cortices are engaged. Although tricortical purchase is utilised by many (12,17,25), voices of disagreement claim that compression does not necessarily lead to loss of dorsiflexion (30). Indeed, some authors recommend quadricortical fixation (21). A recent trial (9) comparing tricortical versus quadricortical syndesmotic fixation concluded that there were no significant differences between either groups in functional scores, pain and dorsiflexion at one year.

Although a larger number of consultants surveyed do favour a tricortical screw, consensus in this matter is certainly lacking (58.7% tricortical ; 33.9% quadricortical).

Müller *et al* (21) recommend that such a screw should be placed 2 to 3 cm above the tibiotalar joint. Although this view has been supported by some biomechanical studies comparing this with a higher screw placement (16), the position of the screw used has been reported variedly in different reports (25). There is no clear view evident from our survey although 2 cm placement from the tibiotalar joint seems to be more popular.

Thompson *et al* (29) compared the use of a 3.5 mm screw with a 4.5-mm screw and found no biomechanical advantage of a 4.5-mm screw over a 3.5-mm in fixation of the syndesmosis. Large fragment screws have been used by some authors (14). There is no clear evidence favouring either size. Some surgeons use two syndesmotic screws for a more rigid fixation. The responses in our survey confirm individual variations.

It is generally thought that internal fixation of the ankle syndesmosis is positional fixation, in which strong compression between the tibia and fibula should be avoided (25) although some disagree (30). It is clear however that if lag screw fixation is chosen, care must be taken to not to over reduce the fibula as this would lead to limitation of dorsiflexion. It is interesting to note that 10.6% of respondents compress the syndesmosis while inserting the screw.

Conventionally it is recommended to remove the transfixation screw prior to unrestricted weight bearing (17). Certain cadaver models also highlight that weight bearing should not be permitted prior to screw removal to prevent breakage (2). Proponents of the tricortical fixation argue that such a screw would work its way loose, allowing more tibio-fibular movement, rather than break (4). In our survey it is of great interest to note that of the 16 surgeons who allow full weight bearing, five tend to use tricortical screw, five use a quadricortical screw and six chose not to respond to the specific question.

The need for removal of the screw stems from the conventional wisdom that breakage of the screw would hamper the final outcome (5) and leaving it in

may lead to loss of movements (6). Many authors have hence recommended routine removal of the syndesmotic screw (12,17,23) although leaving it *in situ* has been practiced in many recent reports (22). Six weeks is probably long enough to permit syndesmotic healing (28) even though it is important to stress that it is not advisable to remove the syndesmotic screw until there are signs of healing of the fibular fracture to avoid diastasis (8). Recent work with the use of bio absorbable screw for such injuries may take the steam out of this debate though (11,19). Close to a majority of the surgeons (83.6%) surveyed do practice routine removal of the syndesmotic screw.

Completion of postal surveys is usually a low priority for busy clinicians due to pressures of a busy practice (3). Surgeons are known to be unenthusiastic in their response to postal surveys with responses as low as 15% (15) and 24.3% (1). Even though a modest response rate of 63.5% is a limitation of this study, postal surveys are useful in establishing the beliefs, attitudes and concerns of physicians in health care settings. As the respondents belonged to a certain region, results may have a regional bias and may not be entirely generalisable. A national survey may however have elicited a lower response rate.

This survey has established an overview of current practice of orthopaedic surgeons with regards to management of ankle syndesmotic injuries. These injuries are managed using a syndesmotic screw by a majority, although the technical aspects of the fixation vary between surgeons. A majority do not like to lag the joint. There is lack of consensus in the post-operative management of these injuries.

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