The Dutch College of General Practitioners (NHG) Practice Guideline
This NHG Practice Guideline is a translation of the Dutch guideline. It is specifically written for Dutch
general practitioners in the Dutch environment. The advice which is given may therefore not be in
accordance with the views of general practitioners in other countries.

NHG Practice Guideline 'Ankle sprains'   (January 2000)
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The guideline and its scientific basis have been updated with respect to the previous
version (Huisarts Wet 1989;32:182-5). The recommendations remain essentially
unchanged but some have been formulated more clearly and with better scientific
justification. This applies especially to the value of the physical examination in detecting a
fracture or ruptured ligament. The examination gives the general practitioner a better basis
for determining which patients are eligible for an x-ray and also which should be treated
with a tape bandage. Since the latter represent only 10 to 20% of patients with an inversion
injury, the examination can prevent the overtreatment of patients with mild sprains.

INTRODUCTION
The NHG Practice Guideline 'Ankle sprains' provides guidance for the diagnosis and
treatment of damage to the lateral ankle ligaments caused by an inversion injury. In this
type of injury, the capsular ligaments on the lateral side of the ankle joint are strained.
Depending on the force applied, the damage can range from a slight sprain to a rupture of
one or more parts of the ligaments. This can be accompanied by a fracture in one of the
bones of the ankle joint. This practice guideline lists the symptoms for which the general
practitioner should consider the possibility of a fracture and should order an x-ray. The
diagnostic process is also designed to distinguish between a mild sprain and a ligament
rupture. This distinction is important because a mild sprain does not necessitate specific
treatment, whereas functional treatment with a tape bandage is preferred for a rupture. By
applying the guidelines in this standard, the general practitioner will be able to
independently treat most patients with an inversion injury.

Background
Acute injury of the ankle is the most common form of injury involving the motor apparatus.
Each year in The Netherlands, an estimated 300,000 patients visit the general practitioner
or the hospital casualty department following an acute ankle injury. At least half of these
injuries take place on playing fields. The incidence of inversion injuries in general practice
is 12 per 1,000 patients per year. The probability of a fracture varies from about 5% in patients going to the general
practitioner to 20% in those visiting the hospital casualty department. Fractures usually
occur in the lateral malleolus or the fifth metatarsal bone, and sometimes in the medial
malleolus or navicular bone. Some of these fractures do not require specific fracture
treatment. The low probability of a fracture means that selective use of x-ray diagnostic
equipment is important. It is possible to reduce the number of x-ray examinations by
performing a simple clinical examination, without the risk that fractures will be missed.
Studies carried out in Dutch casualty departments found the incidence of ligament ruptures
in sprained ankles to be between 10 and 20%. The exact incidence of ruptures in patients
who first visit the general practitioner is not known, but presumably it is close to the lower
end of this range. The anterior talofibular ligament is nearly always involved in a rupture,
sometimes together with one of the other ligaments. However, it is not necessary to
determine whether more than one ligament has been ruptured, for that will not affect the
prognosis or management.
A physical examination immediately after or during the first days following the injury usually
cannot distinguish between a rupture and a mild sprain. This is because pain, swelling, and muscle tension hamper the interpretation of the physical examination. Furthermore, during the acute phase both swelling and pain have a limited positive predictive value in terms of serious injury. Repeating the physical examination a few days later, when the pain and swelling have subsided through rest, is more useful in ascertaining the presence of a rupture.\textsuperscript{9} The treatment of ruptured ankle ligaments has been discussed often during recent decades. Appropriate comparative research has now shown that treatment with a tape bandage is as effective as surgery or immobilization by a plaster cast. This so-called 'functional' treatment is simple to apply, inexpensive, and virtually free of complications, and it allows work and sport can be resumed two to four times sooner than with the use of a plaster cast or surgery.\textsuperscript{10} The prognosis for an inversion injury is good, but the time required for recovery depends on the severity of the injury. Patients with a mild sprain are usually capable of resuming normal activities within 1-2 weeks.\textsuperscript{11} The average duration of absence from work for patients with a functionally treated rupture is 2.5 weeks, and 90\% have resumed work by 6 weeks. Of those who engage in a sport, 60 to 90\% have resumed their activity within 12 weeks and at the same level as prior to the injury. Although residual complaints such as pain, stiffness, swelling, and a feeling of instability or that the ankle is giving way again ('functional instability') occur in 20 to 40\% of patients with a ligament rupture, these complaints do not appear to significantly affect the patient's ability to function.\textsuperscript{13}

**DIAGNOSTIC GUIDELINES**

During the first consultation after the injury, the general practitioner should determine whether there is an indication for an x-ray.\textsuperscript{5} If a fracture is unlikely or has been ruled out, a physical examination should be carried out to distinguish between a sprain and a rupture. Distinguishing between a simple sprain and a rupture can be difficult during the initial consultation if there is a great deal of pain and swelling. If such is the case, the examination should be repeated 4-7 days later. Bruising also usually only becomes visible after this interval. In the interim, the patient should avoid movements which clearly aggravate the pain. Crutches can be used if desired.

**Anamnesis**
Ask about:
- the time and nature of the injury (ankle giving way, fall, external force)
- the ability to bear weight immediately after the injury (standing, walking)
- pain (severity, location, progression after the injury)
- any previous ankle problems or injuries (course and treatment)

**Physical examination**
Always comparing with the other ankle, note:
- the position of the foot with respect to the lower leg
- the location and extent of any swelling
- discolouration due to bruising (usually only visible after a few days)\textsuperscript{9}
- the ability to bear weight on the foot: ask the patient to walk a few steps without assistance

Palpate (and assess the degree of pain it causes):
- the \textit{posterior} side of the lower 6 cm of the lateral and medial malleoli, the base of the fifth metatarsal bone, and the navicular bone\textsuperscript{5}
- the \textit{anterior} side of the lateral malleolus (the insertion of the anterior talofibular ligament)\textsuperscript{9}
• Perform the anterior drawer test (for instructions, see note 14). 9 14

Additional examinations and tests
X-rays should be ordered in case of any of the following:
• abnormal position of the foot with respect to the lower leg
• inability to bear weight on the ankle immediately after the injury and during the examination (i.e., walking a few steps)
• pain upon palpation of:
  • the posterior side of the lower 6 cm of the lateral or medial malleoli
  • the base of the fifth metatarsal bone
  • the navicular bone

Evaluation
• At the first consultation, mild sprain should be diagnosed in patients with mild symptoms. In other words, there is reasonably good ability to bear weight on the foot (walking), there is mild swelling and pain, there is no visible bruising, and the anterior drawer test is negative.
• In patients reassessed 4-7 days later, rupture should be diagnosed if there is:
  • pain during palpation of the anterior side of the lateral malleolus, and
  • visible bruising or a positive anterior drawer test

In all other cases, mildsprain should be diagnosed.

MANAGEMENT GUIDELINES
The guidelines below are applicable when a fracture has been ruled out and the general practitioner has diagnosed either a mild sprain or a rupture during the initial or subsequent consultation.

Information, advice, and non-medicinal treatment
• In case of a mild sprain explain that the ligament has been stretched and that a tape bandage is not required. Normal activities can usually be resumed within 1-2 weeks. If desired, a supportive elastic bandage can be used for a few days. Placing weight on the ankle can be determined by the pain it causes. Instruct the patient about the importance of placing the foot straight ahead and making a rolling-through motion when walking.
• In case of a rupture the following explanation and advice should be given:
  • The ankle ligament has been stretched to such an extent that it has been at least partially torn.
  • Recovery generally takes a few weeks (until work can be resumed) to months (until sports can be resumed), but the prognosis for resuming normal activities is good.
  • Although the ankle may continue to give problems (pain, swelling, and a feeling of instability) for quite some time (e.g., after exercising), it does not require special attention.
  • Treatment with a tape bandage (described below) will aid recovery.

There has not been sufficient investigation of the value of treating either mild sprains or ruptures with ice packs, compression bandages, elevation of the leg, or specific physiotherapy programmes with or without supervision by a therapist. Therefore neither positive nor negative recommendations can be given.15 Physical applications (ultrasound therapy, ultrashortwave diathermy, electrotherapy, and laser therapy) have been well studied, but have not been found to be effective and are therefore not recommended.15
Tape bandage
The principle of treatment with a tape bandage is prevention of inversion, thereby protecting the lateral ligament. At the same time, dorsal and plantar flexion should remain possible, so that the foot can roll through normally during ambulation. The duration of treatment is six weeks.16

The tape should be applied with the foot at a ninety-degree angle to the lower leg, and in slight eversion. The bandage should be changed every two weeks, or earlier if it is too tight or too loose. The patient should be advised to keep the bandage dry in order to prevent the skin from becoming soft and infected. The following instructions should also be given:

- When sitting or lying down, regularly move the ankle through plantar and dorsal flexion.
- Practice walking daily, placing the foot straight in front and rolling through the step as normally as possible.
- If the pain is severe, consider using crutches for a few days.
- If the pain increases as the result of walking, stop, and try again the next day.
- Gradually increase bearing weight on the ankle by increasing the stride and the duration of walking.

Patients who engage in sports can generally resume training after six weeks. Advise them to start with cycling, swimming, or running/jogging on a flat surface. Competitive sports should only be resumed when normal training can be performed correctly.

Medicinal treatment
If desired, paracetamol can be prescribed for a few days (4 times daily, no more than 4,000 mg per day). NSAIDs are not recommended because of the risk of side effects and because research has shown that they do not have a beneficial effect on recovery from an inversion injury.17

Follow-up and prevention
Follow-ups are not necessary for a patient with a mild sprain. Instruct the patient to return if there is no improvement within 1-2 weeks, in which case the physical examination should be repeated.

A patient with a ruptured ligament who is treated with a tape bandage should be seen at two-week intervals for six-weeks. The general practitioner should ask about the symptoms, observe the patient's gait, and replace the bandage. A positive course is characterized by a rapid decrease in pain and swelling, recovery of a normal gait, and complete recovery of daily functioning (including work and sport).

After tape bandaging, patients who engage in sports with a high risk of inversion injury (such as football, basketball, outdoor hockey) should be advised to use an ankle brace for secondary prevention.18

Referral
If there is a fracture, refer the patient to an orthopaedic surgeon. Consider referral to a physiotherapist for training of coordination and muscle strength if marked limitations persist because of a feeling of instability, or the ankle repeatedly gives way, or there is muscle weakness, despite appropriate treatment and preventative measures.19 If treatment is insufficiently effective, consultation with, or referral to, an orthopaedic surgeon can be considered to discuss the possibility of secondary reconstruction of the capsular ligament complex.20
note 1

Two other guidelines for the diagnosis and treatment of acute ankle injuries have been published recently in the Netherlands.¹ ² The CBO consensus was drawn up by a workgroup of orthopaedic surgeons, radiologists, sport physicians, epidemiologists, physiotherapists, and general practitioners. Thus, to serve all professional groups there are now three guidelines which, by mutual agreement, are identical in terms of the main points.


note 2

In the first version of this practice guideline, 'sprain' was used for a mild ligament injury and 'manifest ligament injury' was used for a more severe ligament injury.¹ In this updated version the terms 'mild sprain' and 'rupture' have been chosen in keeping with the literature and the CBO consensus mentioned in the previous note. This distinction has important consequences for treatment and prognosis. In the first version of this guideline, 'eversion injury' was also discussed, but because its incidence is low and no specific treatment is needed, it is no longer included.


note 3

In the Netherlands an estimated 600,000 people sustain ankle injuries each year. Roughly half of these people visit general practitioners or, on their own initiative, hospital casualty departments.¹ At least half the injuries occur on playing fields.² More than three-quarters of the ankle injuries are inversion injuries.

In diagnosis recording projects in Dutch general practice, 'ankle sprain' is coded separately. The Transition Project reports its incidence to be 11.1 per 1,000 patients per year, but does not indicate the severity of the injury nor the percentage of patients treated with a tape bandage.³ However, 85% of the cases are resolved in four weeks or less, which suggests that the course is usually positive. The Continuous Morbidity Registration found an incidence of 12.8 per 1,000 patients per year during the period 1993-1997.⁴ These figures indicate that each year approximately 200,000 patients consult general practitioners because of inversion injuries. For an 'average' practice of 2,350 patients, this means one new patient with this condition every two weeks.

The number of patients visiting hospital casualty departments with ankle injuries can be determined using the Privé Ongevallen Registraties Systeem (PORS) [Private Accidents Registration System] run by the Stichting Consument en Veiligheid [Dutch Consumer and Safety Association]. Since 1983 this system has recorded all private accident cases presented to the casualty departments of 14 representative hospitals and the information is then used to calculate figures for all Dutch hospitals. 'Private accidents' include all accidents except road traffic and occupational accidents and they represent 85% of all accidents. During the period 1990-1994, on average 70,000 patients per year were treated for inversion injuries.⁵ More than half of these patients were referred to specialists for further diagnosis and treatment. The remainder received a single treatment in the casualty
department and/or were referred back to the general practitioner.


note 4

The exact proportion of fractures in patients who visit the general practitioner after an inversion injury is not known. Although the Transition Project reports a fracture of the tibia or fibula in 2% of the patients seeking help for ‘ankle problems’, it is not clear whether inversion injuries alone were involved. In addition, the proportion of foot fractures (particularly of the fifth metatarsal bone) is not given. The fracture rate in patients visiting hospital casualty departments is between 15 and 20%. Zeegers found fractures in 472 (15%) of 3,129 patients with inversion injuries, the majority of which involved the lateral malleolus or the fifth metatarsal bone. These included 54 fractures of the lateral malleolus below the tibiofibular syndesmosis (Weber type A) and 129 fractures of the shaft of the fifth metatarsal bone (Jones’ fracture) or the base of this bone. Functional treatment of these fractures with a tape bandage is usually sufficient. In a study by Stiell et al. of 2,342 patients who visited the casualty department because of an ankle injury, 472 (20%) were found to have a fracture. Here too, at least three-quarters of the fractures involved the lateral malleolus or the fifth metatarsal bone. Eighteen percent of the fractures were avulsion fractures, for which functional treatment is also suitable.


note 5

Studies carried out in Dutch general practices after publication of the first version of this practice guideline found that general practitioners request relatively few x-rays for inversion injuries, the rate ranging from 11 to 17% of cases. This is in keeping with a low prior probability of a fracture in general practice. A descriptive study in four casualty departments found that x-rays were performed in 46 to 88% of inversion injury cases. In a controlled clinical trial (n = 6,489), Stiell et al. studied a set of easy-to-use rules intended to limit the number of x-rays while minimizing the risk of missing a fracture. These ‘Ottawa ankle rules’ specify that an x-ray of the ankle or middle section of the foot should only be obtained in case of:

- inability to place weight on the ankle by walking four steps without assistance immediately after the injury and in the examination room, or
- pain upon palpation of the posterior side of the lower 6 cm of the lateral malleolus, or
- pain upon palpation of the posterior side of the lower 6 cm of the medial malleolus, or
- pain upon palpation of the base of the fifth metatarsal bone, or
pain upon palpation of the navicular bone

The application of these rules by physicians with widely varying clinical experience in the eight casualty departments where the study took place led to a significant reduction in the number of x-rays, without any fractures being missed (sensitivity: 100%, specificity: 45%).

The interobserver reliability of the various rules was good (kappa values: 0.66-0.83).

The Ottawa ankle rules have not yet been similarly evaluated in general practice, but presumably the benefit of their application is mainly to be expected in outpatient clinics where too many x-rays are requested and there is a wish to reduce the number.

Conclusion: the Ottawa ankle rules support the experience-based approach described in the first version of this guideline. Since they are the only well-validated criteria available, they have been included in this revised guideline.


Note 6
In three studies carried out in casualty departments of Dutch hospitals, the rate of ligament rupture in patients with inversion injuries was 8,1 16,2 and 18%,3 respectively. In all cases the diagnosis was made using radiographic contrast imaging of the upper tarsal joint (arthrography) within five days after the injury, in patients selected on the basis of pain, swelling, and functional limitation. A positive arthrogram is highly predictive of the presence of a rupture.


Note 7
An experimental study revealed that in an inversion injury the anterior talofibular ligament takes the strain first and the fibulocalcaneal ligament and/or the posterior talofibular ligaments are only involved secondarily if greater force is applied.1 This has been confirmed in clinical research. During surgery in patients with an arthographically identified rupture, Prins and Van der Ent both found an isolated rupture of the anterior talofibular ligament in half the patients and a combined rupture of the anterior talofibular
ligament and the fibulocalcaneal ligament or the posterior talofibular ligament in the other half. Finally, a study in cadavers by Van Moppes and Van den Hoogenband revealed that these three ligaments should not be viewed as independent anatomical structures but rather as a continuum, which they called capsular reinforcement elements.


note 8
Kannus and Renström analysed twelve randomized studies of the efficacy of different types of treatment for patients with a rupture of one or more ligaments. On the basis of nine outcome variables, they concluded that there was no difference in outcome between an isolated and a combined rupture and that the results in the majority of patients ranged from good to excellent, regardless of whether treatment was by surgery, plaster cast, or tape bandage.


note 9
Van Dijk et al. examined the validity of the so-called delayed examination for diagnosing a rupture in 650 patients who visited the casualty department of a teaching hospital following an ankle injury, without referral by a general practitioner. The findings at surgery or the clinical course in patients who did not undergo surgery were used as the gold standard. After exclusion of those with fractures, contusions, and mild symptoms, 160 patients were eligible for arthrography within 48 hours after the injury and re-assessment after 4 to 7 days (average 5 days). The delayed examination consisted of the following three components:

- palpation of the anterior side of the lower 2 cm of the lateral malleolus (the insertion of the anterior talofibular ligament)
- inspection for discolouration of the skin due to bruising on the lateral side of the ankle
- the anterior drawer test

Physical examination findings were considered to be positive for a rupture if there was pain upon palpation together with visible bruising or a positive anterior drawer test. Neither the patient nor the physician was aware of the result of the arthrogram at the time of the delayed examination. One hundred and thirty-five patients had a positive arthrogram and/or positive delayed examination findings, and underwent surgery. During surgery the diagnosis of 'rupture' was confirmed in 122 of the 650 patients, giving a rupture rate of 19% in the entire study group.

The diagnosis of 'rupture' was correctly predicted in 117 (95%) of the patients on the basis of the postponed examination. The sensitivity was 95% and the specificity was 77%. A rupture was unlikely in the absence of pain upon palpation or if the anterior drawer test was negative in combination with the absence of discolouration due to bruising. The inter-observer reliability for the different components of the postponed examination was found to be reasonable to excellent (kappa values: 0.5-1.0). It should be noted that this study was carried out in a hospital setting with a selected population. The predictive value of a positive delayed examination will be lower in a general practitioner's patient population due to the almost certainly lower incidence of serious injuries such as ruptures.
This may lead to 'overtreatment' of patients who simply have a mild sprain. However, in view of the nature of the treatment (tape bandage) and the fact that the patient would probably have made a rapid recovery by the time of the follow-up, this objection is only relative. Furthermore, the current conservative approach for all inversion injuries means that it might become more common for patients to consult the general practitioner first.

Conclusion: this approach, which was developed in a hospital setting, led to revision of the recommendations given in the first version of this practice guideline and hence inclusion of the principle of the delayed examination in this updated version. Translation of this approach to daily general practice means that after the first examination only patients with a great deal of pain, swelling, and functional limitation need to return 4-7 days later for reassessment. The diagnosis of 'rupture' is then likely if the following are found:

- pain upon palpation of the anterior side of the lower 2 cm of the lateral malleolus and
- discolouration due to bruising or a positive anterior drawer test

In all other cases, the diagnosis should be 'mild sprain'.


note 10

The study carried out by Van Moppes and Van den Hoogenband has been the key to the management of ankle injuries in the Netherlands. In a randomized study they compared three interventions in patients with a rupture: tape bandage for 6 weeks using method of Coumans, surgery followed by plaster cast for 5 weeks, and plaster cast for 6 weeks. Work could be resumed after 2.5, 9.7, and 6.8 weeks, respectively. After 12 weeks, 80% of the patients in the tape group who engaged in a sport had resumed their sport activity, while only 40% of those in the other treatment groups had done so. After one year there were no clinically relevant differences among the three groups. After analysing the results of 12 randomized studies (including the above), Kannus et al. reached the following conclusion: 'It is not difficult to select functional treatment as the treatment of choice for acute complete tears of the lateral ligament of the ankle'. Ogilvie-Harris reached a similar conclusion after examining 37 studies which compared surgery, plaster cast, and/or functional treatment. The recently-published CBO consensus agreed with this conclusion on the basis of its own meta-analysis of the outcomes of studies of superior quality.


note 11

There has been very little investigation of the course of mild sprains and any residual complaints, presumably because the management of these problems has never been the subject of significant discussion. Jackson et al. investigated the course of mild sprains in servicemen and found complete recovery of daily activities within 1-2 weeks. Five years after diagnosis, Zeegers interviewed every tenth patient in a group of 2,728 in whom mild sprain was diagnosed on clinical grounds. Fifty-two percent (n = 164) of this sample group responded. Although 10 to 40% of those interviewed reported having pain, stiffness, a
feeling of instability, and problems with the ankle giving way, these difficulties led to few or no limitations in daily life. Of those who had engaged in a sport (n = 113), only 8% reported having had to give up the sport because of ankle-related problems.


note 12
The term 'functional instability' is found frequently in the literature. It is often used in efficacy studies as an outcome variable, but various definitions are employed. It is a subjective problem in that the patient, on being asked, indicates that he cannot always rely on the ankle and claims to be afraid that the ankle will once again give way. However, this feeling of instability can be present without the ankle ever actually having given way or without the patient feeling limited in his activities. Freeman was the first to develop the hypothesis that the problem is caused by the fact that the proprioceptive receptors in or surrounding the ankle ligament become damaged or lost during the injury.1 Several studies have found no association between functional instability and objectively-measured mechanical instability.2 3 It is assumed that proprioception and loss of muscle strength play a role in the development of functional instability.4


note 13
The prognosis for patients with a treated rupture is good, as shown by the studies of van Van Moppes and Van den Hoogenband (see note 10) and Zeegers, among others. Zeegers compared four forms of functional treatment in patients with an arthrographically identified rupture: tape bandage using the method of Coumans, an ankle brace, a stabilizing shoe, and an elastic stocking.1 This study found that the elastic stocking (the most 'minimal' form of treatment) led to a slightly longer absence from work (23 days compared with 16 days for tape bandage), but that there were no differences among the four forms of treatment in the other usual endpoints. After one year, 80% of the patients in all groups were free of symptoms.


note 14
Performing the anterior drawer test:1
- The patient lies or sits on the examination table with the upper leg resting on the table and the lower leg hanging over the edge.
- Grasp the heel, supporting the sole of the foot with your lower arm, and move the foot from the starting position (foot at 90° to the lower leg) to 10-15° plantar flexion.
- With the other hand, grasp the front of the lower leg about 10 cm above the ankle.
- Ask the patient to relax and move the foot ventrally while keeping the lower leg fixed.
Interpretation: the test is positive if the foot moves 1 cm or more ventrally relative to the lower leg and compared with the healthy limb.


**note 15**

There has been very little good quality research about the effect of *rest, ice, compression,* and *elevation* (known as the ‘RICE’ principle), although these measures are frequently recommended in practice and in the literature for use in the acute or subacute phase. Studies of this principle have generally been of moderate or poor methodological quality and the conclusions are contradictory. Both the guidelines quoted in note 1 and the review by Ogilvie-Harris¹ include overviews of these studies. The conclusion is that there is as yet insufficient scientific verification of the RICE principle.

Several reviews of studies of the efficacy of *physical techniques* have been published recently. Van der Windt et al. found evidence that the use of ultrasound is ineffective.² De Bie et al. examined studies of the effect of ultrasound, electrotherapy, laser therapy, and ultrashortwave diathermy, concluded that these methods are ineffective, and advised that they should not be used.³ There have been very few randomized studies of the effect of specific *home exercises* or *physiotherapy under the supervision of a therapist* and, as far is known, these have not yet been carried out in patients with ligament ruptures. In a randomized study, Oostendorp investigated the effect of an exercise programme (home exercises as well as exercising three times a week under the guidance of a therapist, for 6 weeks) in 24 athletes with a sprained ankle.⁴ Those with ligament ruptures were excluded. Efficacy was measured under blinded conditions after 6, 12, and 24 weeks. The outcome variables were pain, functional instability (defined as ‘fear of the ankle giving way’), and functional recovery (resuming work and sport). No data on recurrences were presented. Results: with the exception of functional instability (p = 0.05), there were no significant differences at 24 weeks. Wester et al. studied the effect of a 12-week daily training programme on a wobble board in 61 athletes with an inversion injury and a negative anterior drawer test at 4-7 days after the injury.⁵ After an average follow-up of 230 days, the participants were asked about pain when engaged in the sport, recurring inversion injuries, and functional instability. Thirteen (21%) of the patients dropped out of the study for various reasons. There was no difference between the treatment and control groups in the degree of pain experienced while engaged in a sport. However, in the treatment group there were significantly fewer relapses (6 versus 13) and episodes of functional instability (0 versus 6). No information was given about the length of time until sport was resumed, the need to discontinue a sporting activity because of ankle problems, or perceived limitations. Conclusion: the latter two studies suggest that beneficial effects on functional instability and/or the occurrence of relapses might be expected from a specific training programme for patients who engage in high-risk sports. Further higher quality research involving greater numbers of patients, including those with ruptures, must be carried out before clear guidelines can be drawn up on this subject.

3. De Bie RA, Hendriks HJM, Lenssen AF, et al. KNGF-Richtlijn Acuut enkelletsel [Royal
Dutch Physiotherapy Society guideline on acute ankle injuries]. Supplement to Ned Tijdschr Fysiotherapie 1998;108 (1).


note 16
A tape bandage is intended to support the ankle joint. Different materials can be used alone or in combination. The bandage material must have an adhesive layer which allows it to adhere to the skin and to itself. Since the direct stabilizing effect of a bandage lasts no longer than about half an hour, the positive effect is presumed to occur primarily through traction on the skin which stimulates muscular activity. ¹
There are various bandaging techniques, such as those of Coumans, Snellenberg, and Van Wingerden. The technique of applying the bandage does not vary greatly among them. Comparative studies using the Coumans bandage have been carried out in the Netherlands. ⁻¹⁻² This technique requires practice and is fairly labour intensive. ² It is not known how extensively this technique is still being used. There are indications that it can probably be done more simply. In a randomized study in 243 patients with an arthrographically identified rupture, Zeegers compared four forms of functional treatment: a tape bandage according to Coumans, an ankle brace, a stabilizing shoe, and an elastic stocking. ¹ Use of the elastic stocking (the most 'minimal' form of treatment) led to slightly longer absence from work (23 days compared with 16 days for the tape bandage), but there were no differences among the four forms of treatment in terms of the other usual endpoints. After one year, at least 80% of the patients in all groups were free of symptoms. Although the small number of patients per treatment group makes it difficult to reach a definitive conclusion, it is worth noting that in this study the simple elastic stocking was more or less equivalent to the other materials. Further research (in general practice!) is required to determine which (preferably general practitioner-friendly and patient-friendly) material will ultimately be the first choice.


note 17
Overviews of randomized controlled trials on the effect of analgesics on the course of ankle injuries (both mild/moderate sprains and ruptures) can be found in the review by Ogilvie-Harris and in the CBO Consensus. ¹⁻² In most studies NSAIDs were compared with placebo or with each other. No studies were found in which paracetamol was compared with an NSAID or placebo. The outcome variables were pain, swelling, functional and activity recovery, and side effects.
Results: although pain usually subsided slightly more rapidly in the treatment groups than in the placebo groups, there were no differences in overall recovery.
Conclusion: NSAIDs have no clinically relevant effect on recovery from ankle injuries. If pain relief is desired, appropriately-dosed paracetamol should be the first choice, partly because of the difference in side-effects.

note 18
Quinn et al. systematically reviewed randomized controlled studies of the effect of primary and secondary prevention of inversion injuries to the ankle.1 Five of the eleven identified studies met the review's inclusion criteria. The studies were carried out in young, active (mainly male) persons who participated in high-risk sports, such as football, basketball, and parachute jumping. The preventive measures studied were a high basketball shoe, an ankle brace worn outside the shoe, a semi-rigid ankle brace, and training on a wobble board. Results: there was a significant reduction in the number of ligament injuries as the result of wearing preventative braces by persons participating in sports following a ligament injury (odds ratio (OR) 0.31; 95% confidence interval (CI) 0.19-0.49). The reduction of risk in persons engaging in a sport and having no history of ligament injury (secondary prevention) was not significant (OR 0.70; 95% CI 0.47-1.03). The wobble board training was only investigated in the context of secondary prevention, but did lead to a significant reduction in ankle ligament injuries (OR 0.30; 95% CI 0.15-0.60). However, given the design of the study, the authors believe further research to be necessary before advocating general use of this technique.2
Conclusion: the use of preventive braces for secondary prevention is beneficial in persons engaged in a sport with a high initial risk of injury to the ankle ligaments.

note 19
The considerations behind this pragmatic advice are as follows. Numerous efficacy studies have found that the prognosis for ankle ligament injury is good to excellent and that a functional approach to ligament rupture (immobilizing by a tape bandage combined with a few simple recommendations) is the treatment of choice. In addition, secondary prevention provided by wearing a brace will benefit patients who engage in sports with a high risk of ankle injuries. Good results will be achieved with this approach in the majority of patients. There have been no good efficacy studies of patients in whom problems leading to limitations in daily life, including sport, persist despite these measures. Given the results of studies of the effect of special training, such as those by Wester et al. (see note 15) and Tropp et al. (see note 18), referral of patients in this specific group may be considered. Further research is required to determine which interventions will be effective for which type of problem.

note 20
In 1980 Duquennoy et al. introduced a surgical method which used tissue available at the site of the injury to reconstruct the anterior talofibular ligament.1 This technique (or a modified version) is currently one of the most commonly used methods for secondary treatment of ankle instability. Castelein et al. described results in 32 patients with severe instability problems (recurrent sprains with pain and swelling) in whom conservative measures had failed.2 Treatment consisted of Duquennoy's reconstructive surgery
followed by 6 weeks in a plaster cast and exercises under the supervision of a physiotherapist. The follow-up period was not mentioned. Results: 22 patients (69%) were completely free of problems. Instability, determined objectively using stress x-rays, decreased on average by 63% (talar tilt) and 40% (drawer test). No details were given about complications.


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