

(2010) 01 KL CK 0037
In the High Court Of Kerala
Case No : A.S. No. 228 of 2000 (A)

State of Kerala

APPELLANT

Vs

Krishnankutty alias Aniyam Nair and Another

RESPONDENT

Date of Decision : 28-01-2010

Acts Referred:

Penal Code, 1860 (IPC) — Section 304A

Citation : (2010) 1 KLJ 740

Hon'ble Judges : M.L. Joseph Francis, J;K.M. Joseph, J

Bench : Division Bench

Advocate : Ranjith Thampan, A.A.G and K.B. Ramanand, G.P, for the Appellant;
Santhosh Subramanian, Sheji P. Abraham and V. Chitambaresh, Sr. Advs., for the Respondent

Final Decision : Dismissed

Judgement

K.M. Joseph, J.—Appellant is the State of Kerala. The first respondent filed the Suit claiming compensation from the appellant and the second respondent for damage arising out of the negligence with which the second respondent Doctor treated the first respondent culminating in the amputation of the left leg (below knee) of the first respondent. The trial court decreed the Suit in a sum of Rs. 1,31,000/- with interest at six per cent from the appellant and second respondent.

2. We shall refer to the parties as in the trial court. The plaintiff suffered an injury when a silicate stone on the sunshade of a building fell down and hit on his left leg, just above the ankle on 19.11.1989. The plaintiff was working at the building site. He was taken to the Medical College Hospital, Thrissur where the second respondent was working. Plastering was done. He was discharged on the same day in the evening. Thereafter, he went back to the hospital on 23.11.1989, complaining of severe pain. Then, the second defendant cut open the plaster and the plaintiff was also administered with certain medicines. On 24.11.1989, fasciotomy was done, however, it was found that even though

fasciotomy was done, amputation below the knee was inevitable. The plaintiff apparently not being satisfied with the treatment, got himself discharged and it is the admitted case that he had to get his left leg below knee amputated at a private hospital.

3. The defendants contended that there was no negligence. In short, the case of the defendants was that the plaintiff developed what is known as compartment syndrome and the Doctors including the second defendant have treated the plaintiff without any negligence and in accordance with the accepted medical practice. However, unfortunately, it got out of hand for no fault of the Doctors and amputation became unavoidable.

4. The trial court, however, found that the second defendant being an experienced Doctor, should have recognised the dangerous situation with his ordinary diligence and done fasciotomy on 23.11.1989. It is found that compartment syndrome had developed. It is found that blisters were diminished and it is found that since emergency fasciotomy was not done on 23.11.2989 which the plaintiff required, there was negligence on the part of the second defendant in giving proper treatment to the plaintiff leading to the amputation of the left lower limb.

5. We heard the learned Government Pleader, the learned Counsel appearing on behalf of the plaintiff as also the learned Counsel appearing for the second defendant.

6. Learned Government Pleader would contend that the plaintiff had come to court alleging negligence in the matter of applying the plaster. But, the court below has correctly found that amputation became inevitable in view of the plaintiff developing compartment syndrome and in such circumstances, the court below erred in finding that there was negligence on the part of the second defendant and holding the appellant State is vicariously liable. He took us through the evidence besides the pleadings. He also pointed out that there was no expert evidence adduced by the plaintiff in support of his claim. Learned Counsel for the second defendant would point out that after the trial court found that the plaintiff had developed compartment syndrome and the amputation was the fall out of the said condition, it ought not to have found the second respondent negligent. He would point out that on 19.11.1989, when the plaintiff was brought to the Medical College Hospital, a fracture was suspected. An X-ray was taken. A closed undisplaced fracture was confirmed. A full leg plastering was adopted under the supervision of the second defendant. He was kept in observation for a few hours. Noticing that there was no adverse circumstance warranting his continued retention in accordance with the accepted practice, he was discharged. He was asked to come after four days. However, it is pointed out that he was also informed that if there was any complication, he should come earlier. In this regard, he pointed out the entries in Ext.B1 Case Sheet marked in red ink. When the plaintiff was brought on 23.11.1989 and he complained of pain again, it is pointed out that in accordance with the established facts, the second

defendant cut open the plaster. He contended that this is one of the methods recommended when incipient compartment syndrome is suspected. He relied on Medical Literature in this regard. He would further point out that the plaintiff was also administered certain medicines to improve his condition. He would submit that resorting to fasciotomy was not necessary and fasciotomy was not without attendant risk. It was only on 24.11.1989 when the plaintiff was examined, it became known that he was developing compartment syndrome or rather acute compartment syndrome and, therefore, it was found that fasciotomy has to be done. This was the opinion of the senior Doctors who were examined as DW1 and DW3. fasciotomy was accordingly done on 24.11.1989 itself. However, unfortunately, it had become a case of ischemic gangrene, necessitating amputation. He would submit that as far as the medical practitioner is concerned, in claims for damages based on negligence, the law is settled. He would submit that in the facts of this case, it is clear that the trial court had erred in finding that there was medical negligence on the part of the second defendant by not having done fasciotomy on 23.11.1989. He would submit that there was no case which the second defendant was called upon to meet, that the situation developed on account of the second defendant not performing fasciotomy on 23.11.1989 and he would contend, therefore, that it cannot be said that with the materials before the court, had fasciotomy being done on 23.11.1989, the amputation could have been avoided.

7. Learned Counsel for the plaintiff would submit that this is a case which attracts the doctrine of *res ipsa loquitur*. The plaintiff, a construction worker, went to the Medical College Hospital with a simple fracture and only on account of the negligence on the part of the Doctor, he was deprived of his lower left limb. He would submit that in the case of this nature, the burden is squarely on the second defendant Doctor. He would further point out that it is noteworthy that the second defendant has not challenged the Decree by filing an Appeal and, therefore, he cannot be heard to question the Decree in the Appeal filed by the State. He would further contend that it is not open to the second defendant to rely on the medical literature in this Court without even having produced and put it to the witnesses who were examined.

8. In order to appreciate the contentions, it is necessary to refer to the pleadings of the parties. We would like to refer to the following averments in the plaint:

2. Immediately after this incident, the plaintiff was taken to the Medical College Hospital, Trichur and he was admitted there by the doctor on duty Sri. Jayaprakash, the 2nd defendant herein Sri Jayaprakash examined him in a slipshod manner without any care and attention most rashly and negligently. The 2nd defendant without doing any washing or cleaning of the injuries on the leg, knowing that there is fracture of bones, administered plaster on the leg and completely covered the leg in plaster from above the knee, down to the ankle. On the same day, by about 4.30 p.m., the 2nd defendant asked the petitioner to go home and come after four days, and accordingly the petitioner was sent home

by the 2nd defendant at that time told the petitioner that as there is fracture, there would be some pain and there is no other go, but to suffer it.

3. While at home, to the petitioner, there had began pain in the leg, and as the 2nd defendant had told him to come to the O.P. only on the 4th day of putting plaster, we went to the hospital again on 23.11.1989. The 2nd defendant examined him, and immediately asked his relatives to take him to the dressing room. By this time, the petitioner had high temperature and (L) leg was almost demobilised, there was infection, swelling and oedema in the injuries on the leg. The 2nd defendant was seen in panic and all on a sudden the 2nd defendant cut the plaster extensively and to his astonishment whole (L) leg from ankle and upwards was completely infected and there was heavy foul smell and on several positions bone could be seen as flesh because pus. During the time, the petitioner was fainting at times, and he had the fear that a very dangerous situation is ahead. Immediately, the 2nd defendant admitted him in the ward, gave some medicines. Next day, i.e. on 24.11.1989 morning 2nd defendant along with one Dr. Sri Sunny, visited him and the 2nd defendant examined him, and while so doing, the 2nd defendant was heard saying to the other doctor "this is the very serious case". And by this time, the condition of the plaintiff had already slipped in to grave danger and according to the doctors in the hospital, the patient ought to have been given correct and proper treatment by yesterday itself, and ought not have put plaster completely on the leg.

14. The loss of (L) leg below knee of the petitioner occurred due to the rash and negligent way, the 2nd defendant was treating the petitioner, and the 2nd defendant was handling the situation in a most irresponsible manner in callous indifference in utter disregard of all medical norms. The 2nd defendant was grossly negligent and most irresponsible and guilty of doing a wrong act in his administering plaster on the (L) leg of the petitioner when there was injuries and wounds on the leg and oedema formed. This had caused and resulted in gangrene death of issue due to the failure of supply of blood to it.

We shall now refer to paragraphs 3 and 5 of the Written Statement filed by the second defendant. It reads as follows:

3. It is true that the plaintiff was brought to the causality of Medical College Hospital on 19.11.1989 as alleged in para No. 2 of the plaint. He had fracture in the form of tenderness over the lower third of left tibia. It was confirmed clinically and however, an X-ray was also taken which showed an undisplaced fracture. The patient had abnormal mobility with minimal deformity. This defendant, after a very careful examination, took a decision to apply a plaster cast on his leg. After due procedures of cleaning and dressing, administering injections, the plaintiff was given a long leg cast from the plaster room. Then, he was kept in the observation ward till evening around 5 P.M. and as he did not develop any problem or complication, he was discharged from the observation ward. He was put on antibiotics and other medicines. All the details of the treatments recorded in the O.P. ticket. He was specifically instructed to report for

review on thursday or earlier if necessary and this fact was written in red ink in the O.P. ticket. It was done for seek urgent medical advice, if needed. The allegation that there were injuries on his leg is incorrect.

5. Some of the allegations in para No. 3 and 4 are not true. It is true that the plaintiff came to the hospital on 23.11.89 with complaints of pain. He was admitted to ward No. 1 and on examinations, presence of blisters were found on the dorsum of foot. Then, the plaster of pans was split completely and blisters were found on the leg. He was directed to continue antibiotics etc., and also to have toe movements. However, the allegation that there was high temperature, infection, demobilisation were all incorrect. The further allegation that the bone was exposed is also untrue. As swelling was found, according to this defendant, the best treatment option was to cut the plaster off and to observe his vascularity. It was done so. His leg was kept elevated and other necessary instructions were also given. On 24.11.89 in the morning, the unit chief Dr. P.C. Sunny, Associate Professor was also consulted and he also assessed the condition of the plaintiff. It was suspected that the plaintiff was developing a compartment syndrome and fasciotomy of all compartments of the leg was advises with subsequent evaluation of the circulation to the leg. Then, this defendant had a personal discussion with the anaesthetist. Finally, after other due procedures at about 11.40 A.M. an extensive fasciotomy of all the compartments of the leg was done under spinal anaesthetist. Then, on the dorsum of foot, there was a black haematoma which was drained. Post operatively, he was put on ampicillin and gentamycin. However, this defendant noted that the toe movements were not possible. On 24.11.89 itself, the relatives of the patient were informed that it might be necessary to remove the gangrenous portions of the leg, and amputation was a possible eventuality. Hence, consent was also obtained from Smt. Santha, wife of the plaintiff for the same. But there was a redeeming feature of the increase in the warmth noticed post operatively, gave a faint hope of being able to salvage the limb.

It is also contended that the occurrence of a complication shall not be considered as a result of negligence on the part of the Doctor who treated the patient.

9. The court below has found that the plaintiff developed compartment syndrome. The court below has not accepted the case of the plaintiff that there was negligence in the matter of applying plaster. According to the defendants, once the court found that there was no negligence in the matter of applying plaster and what is more, accepted the case of the defendants that the amputation was caused by compartment syndrome, the court below erred in decreeing the Suit only on the basis that the fasciotomy was done on 24.11.1989, and that it should have been done on 23.11.1.989. The plaintiff, on the other hand, pointed out that this is a case where the doctrine of *res ipsa loquitur* is squarely applicable.

10. In our view, the following questions must be considered and answered by us:

- 1) What is the principle of law applicable in a civil action for determining negligence?
- 2) Is the doctrine of *res ipsa loquitur* applicable?
- 3) What is compartment syndrome?
- 4) Whether there was any breach of the duty of care by the second defendant?
- 5) What is the accepted mode of treatment for compartment syndrome?

11. As far as the first question is concerned, the matter is no longer *integra* and is covered by a large body of case law. The Indian Courts have essentially followed what is called as the *bolam* principle, a principle which has come to be named after the name of the parties in the case which was decided by a court of appeal in 1957. Suffice it, for our purpose, that we refer to the decision of the Apex Court in *Jacob Mathew Vs. State of Punjab and Another*, . That was a case where an aged patient in an advanced stage of terminal cancer succumbed due to the unavailability of oxygen cylinders with oxygen, which was sought to be administered by the appellant Doctor. The appellant was sought to be charged u/s 304A of the Indian Penal Code. The Apex Court after exhaustive review of the principles in the case law on the point, has *inter alia*, held as follows:

11. According to Charlesworth & Percy on Negligence (10th Edn. 2001), in current forensic speech, negligence has three meanings. They are: (i) a state of mind, in which it is opposed to intention; (ii) careless conduct; and (iii) the breach of a duty to take care that is imposed by either common or statute law. All three meanings are applicable in different circumstances, but any one of them does not necessarily exclude the other meanings, (para 1.01). The essential components of negligence, as recognised, are three: "duty", "breach" and "resulting damage", that is to say:

- (1) the existence of a duty to take care, which is owed by the defendant to the complainant;
- (2) the failure to attain that standard of care, prescribed by the law, thereby committing a breach of such duty; and
- (3) damage, which is both causally connected with such breach and recognised by the law, has been suffered by the complainant, (para 1.23).

If the claimant satisfies the court on the evidence that these three ingredients are made out, the defendant should be held liable in negligence, (para 1.24).

It is also important to refer to paragraph 12 wherein the Court has noticed the distinction between criminal liability and civil liability in the matter of negligence. It reads as follows:

12. The term "negligence" is used for the purpose of fastening the defendant with liability under the civil law and, at times, under the criminal law. It is contended on behalf of the respondents that in both the jurisdictions, negligence

is negligence, and jurisprudentially no distinction can be drawn between negligence under civil law and negligence under criminal law. The submission so made cannot be countenanced inasmuch as it is based upon a total departure from the established terrain of thought running ever since the beginning of the emergence of the concept of negligence up to the modern times. Generally speaking, it is the amount of damages incurred which is determinative of the extent of liability in tort; but in criminal law, it is not the amount of damages but the amount and degree of negligence that is determinative of liability. To fasten liability in criminal law, the degree of negligence has to be higher than that of negligence enough to fasten liability for damages in civil law.

It is also relevant to refer to paragraph 15 where the Court has held as follows:

15. In civil proceedings, a mere preponderance of probability is sufficient, and the defendant is not necessarily entitled to the benefit of every reasonable doubt; but in criminal proceedings, the persuasion of guilt must amount to such a moral certainty as convinces the mind of the Court, as a reasonable man, beyond all reasonable doubt. Where negligence is an essential ingredient of the offence, the negligence to be established by the prosecution must be culpable or gross and not the negligence merely based upon an error of judgement.

We would also think it apposite to refer to the following passages:

19. An oft quoted passage defining negligence by professionals, generally and not necessarily confined to doctors, is to be found in the opinion of McNair, J. in *Bolam v. Friern Hospital Management Committee* 9 WLR at p. 586 in the following words: (AUER. p.121 D-F):

Where you get a situation which involves the use of some special skill or competence, then the test as to whether there has been negligence or not is not the test of the man on the top of a Clapham Omnibus, because he has not got this special skill. The test is the standard of the ordinary skilled man exercising and professing to have that special skill. A man need not possess the highest expert skill.... It is well-established law that it is sufficient if he exercises the ordinary skill of an ordinary competent man exercising that particular art. (Charlesworth & Percy, *ibid*, para 8.02).

20. The water of Bolam test has ever since flown and passed under several bridges, having been cited and dealt with in several judicial pronouncements, one after the other and has continued as neat, clean and a well-condensed one. After a review of various authorities Bingham, L.J. in his speech in *Eckersley v. Binnie* 10 summarised the Bolam test in the following words: (Con.LR. p. 79):

From these general statements, it follows that a professional man should command the corpus of knowledge which forms part of the professional equipment of the ordinary member of his profession. He should not lag behind other ordinary assiduous and intelligent members of his profession in the knowledge of new advances, discoveries and developments in his field. He should

have such an awareness as an ordinarily competent practitioner would have of the deficiencies in his knowledge and the limitations on his skill. He should be alert to the hazards and risks in any professional task he undertakes to the extent that other ordinarily competent members of the profession would be alert. He must bring to any professional task he undertakes no less expertise, skill and care than other ordinarily competent members of his profession would bring, but need bring no more. The standard is that of the reasonable average. The law does not require of a professional man that he be a paragon combining the qualities of polymath and prophet. (Charlesworth and Percy, *ibid.*, para 8.04).

21. The degree of skill and care required by a medical practitioner is so stated in Halsbury's Laws of England (4th Edn., Vol. 30, para. 35):

35. The practitioner must bring to his task a reasonable degree of skill and knowledge, and must exercise a reasonable degree of care. Neither the very highest nor a very low degree of care and competence, judged in the light of the particular circumstances of each case, is what the law requires, and a person is not liable in negligence because someone else of greater skill and knowledge would have prescribed different treatment or operated in a different way; nor is he guilty of negligence if he has acted in accordance with a practice accepted as proper by a responsible body of medical men skilled in that particular art, even though a body of adverse opinion also existed among medical men:

Deviation from normal practice is not necessarily evidence of negligence. To establish liability on that basis it must be shown (1) that the defendant has not adopted it, and (3) that the course in fact adopted is one no professional man of ordinary skill would have taken had been acting with ordinary care.

The above said three tests have also been stated as determinative of negligence in professional practice by Charles worth and Percy in their celebrated work on Negligence (*ibid.*, para 8.110).

The Apex Court also noted the need for looking at the issue of negligence in the context of the medical profession with a difference. It held, *inter alia*, as follows:

31. The subject of negligence in the context of the medical profession necessarily calls for treatment with a difference. Several relevant considerations in this regard are found mentioned by Alan Merry and Alexander McCall Smith in their work *Errors, Medicine and the Law* (Cambridge University Press, 2001). There is a marked tendency to look for a human actor to blame for an untoward event, a tendency which is closely linked with the desire to punish. Things have gone wrong and, therefore, somebody must be found to answer for it. To draw a distinction between the blameworthy and the blameless, the notion of *mens rea* has to be elaborately understood. An empirical study would reveal that the background to a mishap is frequently far more complex than may generally be assumed. It can be demonstrated that actual blame for the outcome has to be attributed with great caution. For a medical accident or failure, the responsibility may lie with the medical practitioner and equally it may not.

Finally, the Apex Court in Jacob Mathew Vs. State of Punjab and Another, , concluded stating, inter alia, as follows:

48. We sum up our conclusion as under:

(1)...Negligence becomes actionable on account of injury resulting from the act or omission amounting to negligence attributable to the person sued. The essential components of negligence are three: "duty", "breach" and "resulting damage."

(2)...A simple lack of care, an error of Judgment or an accident, is not proof of negligence on the part of a medical professional. So long as a doctor follows a practice acceptable to the medical profession of that day, he cannot be held liable for negligence merely because a better alternative course or method of treatment was also available or simply because a more skilled doctor would not have chosen to follow or resort to that practice or procedure which the accused followed. When it comes to the failure of taking precautions, what has to be seen is whether those precautions, were taken which the ordinary experience of men has found to be sufficient; a failure to use special or extraordinary precautions which might have prevented the particular happening cannot be the standard for judging the alleged negligence. So also, the standard of care, while assessing the practice as adopted, is judged in the light of knowledge available at the time of the incident, and not at the date of trial. Similarly, when the charge of negligence arises out of failure to use some particular equipment, the charge would fail if the equipment was not generally available at that particular time (that is, the time of the incident) at which it is suggested it should have been used.

(4) The test for determining medical negligence as laid down in Bolam case, WLR at p.586 holds good in its applicability in India.

12. Res ipsa loquitur:

Res ipsa loquitur means the thing speaks for itself. Syad Akbar Vs. State of Karnataka, was a case u/s 304A of the IPC. No doubt, the Court had occasion to consider the principle. It held as follows:

As a rule, mere proof that an event has happened or an accident has occurred, the cause of which is unknown, is not evidence of negligence. But, the peculiar circumstances constituting the event or accident, in a particular case, may themselves proclaim in concordant, clear and unambiguous voices the negligence of somebody as the cause of the event or accident. It is to such cases that the maxim res ipsa loquitur may apply, if the cause of the accident is unknown and no reasonable explanation as to the cause is coming forth from the defendant. To emphasis the point, it may be reiterated that in such cases, the event or accident must be of a kind which does not happen in the ordinary course of things if those who have the management and control use due care.

The Court further held as follows:

25. From what has been said above, it is clear that even in an action in torts, if the defendant gives no rebutting evidence but a reasonable explanation, equally consistent with the presence as well as with the absence of negligence, the presumptions or inferences based on *res ipsa loquitur* can no longer be sustained. The burden of proving the affirmative, that the defendant was negligent and the accident occurred by his negligence, still remains with the plaintiff; and in such a situation, it will be for the Court to determine at the time of Judgment whether the proven or undisputed facts, as a whole, disclose negligence.

The Medical Literature relied on by the second Defendant:

In JBJA Journal of Bone and Joint Surgery - American 1996-1998, September 1996, Volume 78-A, Number 9, it is, *inter alia* stated as follows:

Compartment syndrome is a well recognized complication of a fracture of the tibial shaft. Despite attempts to document the pathophysiology of compartment syndrome, the clinical recognition of this disorder is frequently difficult. If left untreated, compartment syndrome not only results in the loss of nerve and muscle function but also may lead to infection, myoglobinuria and renal failure, and even amputation.

A closed tibial fracture is one of the conditions most frequently associated with the development of compartment syndrome. Compartment syndrome occurs after both closed and open tibial fractures; the prevalence has ranged from five (1 per cent) of 411 fractures to eighteen (9 per cent) of 198 fractures. The range probably reflects the varying percentage of high velocity injuries seen at different medical centers.

Overview:

A compartment syndrome of the leg may be a devastating complication of a tibial fracture. Meticulous and repeated examinations of the patient who has such a fracture are needed to ensure that the diagnosis is not missed. In patients who are conscious, sensory changes usually occur before motor changes. Pain on passive stretching of the muscles in a given compartment may be the earliest clinical indication. In patients who are obtunded or anesthetized, objective criteria must be used to make the diagnosis. Intracompartmental pressure is the sole objective measurement and constitutes an indirect measurement of muscle and nerve ischemia. We believe that the most reliable measurement is the difference between the diastolic blood pressure and the intracompartmental pressure (differential pressure, or P), and we consider a differential pressure of less than thirty millimeters of mercury (4.00 kilopascals) to be indicative of compartment syndrome. Patients who are managed with tibial nailing are at particular risk, especially if reamers and prolonged traction are used. In these situations, monitoring of the pressure in the anterior compartment is a judicious step. If the nail is inserted without the use of continuous traction or reaming, incidental but short-lived increases in pressure will occur, but continuous

monitoring is not needed. Once a compartment syndrome has been diagnosed, emergent fasciotomy is needed to avoid permanent neurological sequelae. Many techniques are available but regardless of the method chosen all four compartments must be released throughout their entire extent. A delay of more than six hours in the diagnosis or the fasciotomy usually leads to permanent weakness. The surgeon must have a high index of suspicion for compartment syndrome for all patients who have a tibial fracture.

In *Orthopaedic Care Textbook* by John Gray Seller III, M.D., it is stated that there are three major classifications, namely incipient compartment syndrome, acute compartment syndrome and chronic compartment syndrome. We are not concerned with chronic compartment syndrome. As far as incipient compartment syndrome and acute compartment syndrome, it is stated as follows:

Incipient Compartment Syndrome:

This condition represents an impending compartment syndrome. Compartment syndrome is likely to develop unless intervening measures prevent it. In incipient compartment syndrome, the tissue-pressure measurements may not be high enough to fulfill the criteria for compartment syndrome, but the patient is at high risk for its development. During this early stage, there is no irreversible muscle or nerve damage due to increased pressure. An example of an incipient compartment syndrome would be a patient complaining of intolerable pain after having an extremity cast applied. If action is not taken to remove or bivalve the cast, compartment syndrome may develop. Another example is revascularizing a limb that has had prolonged ischemia (over 6 hours). If prophylactic fasciotomies are not done, there will most likely be reperfusion injury, edema, and pathologic intracompartmental pressures.

Acute Compartment Syndrome:

Acute Compartment syndrome is the most common type of compartment syndrome. There is usually a specific point in time when an injury occurred. An acute compartment syndrome develops when a significant injury is imparted to an extremity, causing soft-tissue and often skeletal damage. While acute compartment syndromes are usually from traumatic causes, they can be associated with atraumatic ones (e.g., post viral rhabdomyolysis). For established compartment syndromes, surgical treatment is indicated. Fasciotomy is the most effective way to diminish interstitial pressures.

In *Campbell's Operative Orthopaedics* (Ninth Edition), it is, inter alia, stated as follows:

When incipient compartment syndrome is suspected, several procedures can be used to decrease the likelihood of development of a fullblown compartment syndrome. Schwartz et al listed as factors in the development of the syndrome the thigh multiple injuries, systemic hypotension, history of external compression of the thigh, use of military antishock trousers, coagulopathy, vascular injury,

and trauma to the thigh with or without femoral fracture. The use of colloid or crystalloid fluids, blood replacement, and maintenance of coagulability by replacement of platelets and plasma can deter the development of compartment syndrome. Heppenstall et al. showed that cellular metabolic derangement in skeletal muscle is more closely associated with the difference between mean arterial pressure and compartment pressure than with compartment pressure alone. They believe a pressure difference of 30 mm Hg in normal muscle with a higher metabolic demand to be safe levels.

In isolated limb injuries, splitting of the cast and underlying padding can decrease compartment pressure by as much as 50% to 85%. Any circular constrictive bandages also should be released. Positioning of the limb is important; placing the limb at the level of the heart produces the highest arteriovenous gradient. On the other hand, elevation of the limb decreases arterial inflow without significantly increasing venous outflow, thus increasing local ischemia. If symptoms do not resolve within 30 to 60 minutes after appropriate treatment, pressure measurement should be repeated, and, if equivocal, fasciotomy is indicated.

In JBJS, it is *inter alia*, stated as follows:

The application of a plaster cast to a traumatized limb may result in excessive compression due to secondary swelling of the injured soft tissues. When signs and symptoms of this compression appear, it is accepted orthopaedic practice to cut the cast and underlying padding to relieve the pressure. The effect of this empirical practice, however, has not been substantiated by experimental evidence as to the extent of the reduction in pressure that results from cutting the cast and padding. Similarly, an absolute need to cut the underlying padding along with the plaster cast has not been demonstrated, although it has been strongly recommended.

In this experiment, which was designed to evaluate these recommendations quantitatively, we analyzed the following: (1) the effects of a plaster cast on limiting compartment size (volume containment), and (2) the effects on intracompartmental pressure produced by sequential splitting of first the cast and then the padding.

In Group 1 (dry Webril), the data showed that the average intracompartmental pressure fell 30 per cent after the cast was split on one side. More significant, however, was the 65 per cent total reduction in pressure that occurred after the cast was spread. Splitting the Webril caused only another 10 per cent reduction in intracompartmental pressure. Complete removal of the cast decreased the pressure another 15 per cent - a total decrease of 85 per cent from the original maximally elevated state. Groups 2 and 3 showed similar results, although the percentage reductions in pressure after the procedures were not as great as in Group 1.

Findings:

13. DW1 was the Professor and Head of the Department of Orthopaedics at the Medical College Hospital, Thrissur during the relevant time. He has MCH Orthopaedics from the Liverpool University in England. He would say as follows:

"We have applied long leg cast. This is the usual type of cast used. Usually, in an undisplaced fracture, we put plaster and kept for observation for a few hours and will be treated as out-patient. They will be asked to go back after a few days for review, or if they find any problem like pain or swelling, they can report earlier at any time. Whenever this complaint of pain we have to bivalve (split) the plaster and observe the circulation and toe movements usually kept elevated. That is seen done in this case also." He would say that there were blisters on his skin on 24.11.1989 and that the patient was developing compartment syndrome. In such a situation, a liberal fasciotomy has to be done. He would further say that he did not find any of the symptoms of gas gangrene. In Cross Examination, he would say as follows:

The patient was a man of ordinary health and 38 years of age in 1989. He would say that when blood is blocked, tissues became dead. Gas gangrene occurred in dead tissues. He says that he was not able to say how old were the blisters. He would say that ischemia means poor circulation. He would further say that blisters may occur within 24 hours of ischemia. He would say that the case-sheet does not show that the patient was kept under observation. He would say that the patient had ischemic gangrene and was, therefore, advised amputation. In answer to a question, whether usually a person having fracture shall be kept under medical observation at least for 48 hours, he would say that it is advisable. He has stated that this 48 hours can be crucial. He would then say that usually, an undisplaced fracture was treated as out-patient. He is not able to say who has written undisplaced fracture in red ink. He would say that there is facility to treat inpatient in the Hospital. Undisplaced fracture is considered as low veracity fracture. He would say that all fractures cannot be admitted in the hospital. He would say that the lack of facility was not recorded in Ext.B 1.

14. DW2 is the second defendant himself. He is also a MCH from Liverpool University in England. He has done MS in Orthopaedics from MNA. MS. He was an Assistant Professor in 1989. He would say that the plaintiff had fracture on the lower third of the left tibia. It was an undisplaced fracture. He would say that it was ascertained to be a closed fracture. A long leg plaster was applied. He would say that there was no external injury. He kept the plaintiff under observation, to know whether the patient is developing any problem and for setting his plaster. The patient was allowed to go only in the evening after nearly six hours. Had the patient developed any problem, he would have been kept. He would say that it is not necessary to keep a person with closed fracture in the hospital for observation. He would say that he had instructed review on Thursday or earlier if necessary and that is recorded in Ext.B1(a). It is marked in red ink. When he returned on 23.11.1989, as soon as he came, his plaster was split. The plaintiff was complaining of pain inside the plaster. There were a few blisters on

the dorsum of the toes. The toe movements were diminished. He instructed that circulation be watched and routine tests were done. In answer to a question as to why his plaster was split, he would say that he wanted to know the condition of the leg and to relieve the pressure of the plaster. He prescribed necessary medicines. On 24.11.1989, he consulted his Unit Chief and Professor Mani (apparently DW1). At that time, he would say that the patient was developing compartment syndrome. Blood circulation was decreased. His seniors wanted him to do an emergency fasciotomy it was done within one hour. The purpose of operation was to relieve the pressure inside the leg compartments and to improve the circulation. There was ischemic gangrene. He was on leave on the 25th as his sister's marriage was on 26th. He denies negligence on his part. In Cross Examination, he would say as follows:

It is not necessary always to keep the patient under observation for not less than 48 hours. He would say that blisters can develop as early as 3 to 4 hours or after 3 to 4 days, he would say that they developed due to the oedema under the tissue. In answer to a question whether blisters usually come when there is injury, he would say that blisters always occur on intact skin. A question is put as to how much will it take to develop blisters at the site of injury and his answer was that it depends on the violence, injury and the response of the person to the injury. He would say that he did not see any problem till evening and, therefore, he suggested him to go home and rest at home. He prescribed four medicines. One was to reduce the swelling. The other two were to relieve the pain. He would say that he did not record in Ext.B1 that the patient had closed fracture on 19.11.1989. He would say that silicate stone coming into contact with the skin can cause skin injury and it may cause a fracture without skin injury also. He would submit that he did not anticipate any infection, since it was a closed fracture. In answer to the question why the patient required fasciotomy, though it was a closed fracture, he would say that following the fracture, oedema developed inside. That increased the pressure and decreased the blood circulation. That acts like a cyclical change and fasciotomy was done to reduce the pressure. A question was put as follows:

I say that you without noticing the injury on the outer side of the fracture, applied long leg plaster and it caused to develop infection?" He replied in the negative. He would say that he sent the patient from the hospital in good faith and has given clear instructions to follow up. He had consulted seniors whenever it was necessary. He denies that there was lack of proper treatment which caused infection and so he consulted seniors. He denies the allegation of wrong treatment. In Re-examination, he would say that there was no wrong diagnosis and that the entry that it was a closed fracture was made on 23.11.1989. DW3 is also a MS and MCH from Liverpool University. He was the Unit Head, he had also occasion to see the plaintiff on 24.11.1989 at the request of the second defendant. When he saw him, there was no blister. He would say further as follows:

There was consultation among them and it was decided to do fasciotomy of all the compartments because he was developing a compartment syndrome. He would say that in the case of a fracture like this usually give above knee plaster which was done in this case also. He would say that it was not necessary to retain him in the hospital after plastering. He would say, in answer to the question as to what was the exact cause that necessitated amputation that the patient developed compartmental syndrome which did not respond to fasciotomy. He would say that he has seen the record of treatment given to the plaintiff and that is a usual method of treatment. In Cross Examination, he would say, inter alia, as follows:

Compartmental syndrome developed due to the obstruction of the micro circulation of the tissue of the leg. The obstruction can occur within a few hours or after a few days. In answer to a question that the patient under plaster be kept under observation for 48 hours, he would say not necessary. Compartment syndrome can develop slowly. He would say in answer to a question that it is necessary to make the treatment foolproof to keep the patient under observation of an expert Doctor. He was further asked the following question:

This unfortunate development could be avoided, if the patient was kept in the hospital. He answers it by saying "Yes, if could see him". He would say that he cannot say when the syndrome developed. He would say that on 25.11.1989 when he saw the patient, the extremity was cold. The muscles were black. There was no vascularity. It showed that the leg had become gangrenous. He would say that in certain cases, it is very speedy. In Re-examination, he would say that the possibility of compartment syndrome in the case of a closed fracture is very rare.

15. The plaintiff suffered a fracture of the third portion of the left tibia on 19.11.1989. It is recorded in Ext.B1(a) as a closed fracture. This was recorded on 23.11.1989. This was after taking an X-ray. Plaster cast was applied. Even though the plaintiff had a case in regard to the negligence in applying plaster cast, the court below has not accepted the said version. We also do not think that there is anything on record to justify and interfere with the said finding.

16. The case of the defendants is that the amputation became inevitable on account of ischemic gangrene which, in turn, resulted from compartment syndrome.

17. In the light of the evidence of Dws. 1 to 3, we are inclined to accept the case of the defendants that the plaintiff developed compartment syndrome which led to the amputation.

18. The question further arises whether in the light of the case set up by the plaintiff and the evidence on record, the court below was justified in finding the second defendant negligent and consequently the first defendant is liable, on the basis that the fasciotomy should have been done on 23.11.1989 itself.

19. When a patient develops fracture, the amputation of the leg cannot be said

to be a normal consequence of the fracture. In fact, in the literature we have extracted, it is stated that a closed fracture is one of the conditions frequently associated with the development of compartment syndrome. The plaintiff did complain of severe pain even on 19.11.1989. He was consoled by the defendant who told him that there will be some pain following the fracture. Admittedly, medicines were prescribed for the pain by the second defendant. The plaintiff presented himself on 23.11.2009 in the morning. The second defendant cut open the plaster. According to him, it was done to see the condition and also to relieve the pressure. Admittedly, he noticed blisters on the dorsum of the toes. Admittedly, he further noticed that there were decreased toe movements undoubtedly compartment syndrome is a condition which can arise from a fracture. Even going by the literature produced before us, what can be said to be established, is this: In a case of an acute incipient compartment syndrome which it is argued before us by the second defendant was suspected on 23.11.1989, going by the literature which was made available, while cutting open the plaster, could be said to be regarded as a method, the very same literature would clearly indicate that fasciotomy must be resorted to if within 30 to 60 minutes, symptoms do not resolve after pressure measurement, if it is an equivocal. We also notice that the medical literature cited by the second defendant would itself indicate that a Surgeon must have a high index suspicion for compartment syndrome for all patients who have a tibial fracture and more importantly, a delay of more than six hours in the diagnosis or the fasciotomy leads to permanent weakness. It is no doubt true that evidence was not led as to whether even if fasciotomy had been done on 23.11.1989 the second defendant suspected, even according to him, the onset of incipient compartment syndrome, there was indeed a breach of duty on his part in not resorting to immediate fasciotomy, at least after closely observing the patient on 23.11.1989. We cannot overlook the fact that in a civil action based on medical negligence, there need not be gross negligence as in a criminal action, to order compensation.

We see no merit in the Appeal. It is dismissed. The parties are to bear their respective costs.