

Surg Gynec Obst
4: 290-293,
Feb. 15, 1932,
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Fractures Oration, 1931

SURGERY, GYNECOLOGY AND OBSTETRICS

SOME OLD TRUTHS ABOUT FRACTURES¹

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THE object of the Clinical Congress of the American College of Surgeons is to increase the knowledge of the members of the College by intimate contact and the exchange of ideas. During your sojourn in New York, you are being shown and told many new ways and means of surgical treatment, new methods of diagnosis, new theories as to the causation of surgical conditions. I am sure that much of it will prove helpful to you in your thinking and in your practice. I trust that much of it will prove to be true.

Let me confess to you now, lest your disappointment be too great later on, that I have nothing new to offer you; hence the title I have selected "Some Old Truths About Fractures." My excuse for daring to come before you with such a paltry and time worn offering is that only too often the results of fracture treatment that we see among our own patients as well as those of our colleagues can be explained only by supposing that some of these old truths have either been forgotten or neglected. Our bad results are due more to neglect, procrastination, and carelessness than to ignorance. I, therefore, feel justified in discussing with you some of these old truths.

In fractures, the injury is not limited to bone. When due to direct violence there is contusion of the overlying parts. The ligaments and other supporting tissues of the adjacent joints are strained if not actually torn. The excessive muscular effort made in resisting the traumatizing force may injure tissue. When the force is sufficient to cause displacement of fragments, the sharp edges of the broken bone ends tear periosteum, overlying muscles, tendon sheaths, blood vessels, and nerves. There is local hemorrhage from broken bone and from lacerated soft parts. In fractures, the injury is not limited to bone.

Proper first aid treatment should be taught in medical schools but of still greater importance is the education of the public. Most of the additional and quite unnecessary trauma occurs before the patient reaches medical aid.

The surgeon may disclaim responsibility but it is his duty to try to teach the public. The value of early splintage was well proved by the British Medical Service when they sent the Thomas splint out with the stretcher bearers.

The injuries resulting from fractures are not limited to those occurring at the time of the accident. Unwise attempts to use the injured extremity may cause or increase displacement of fragments, increase the laceration of soft parts, and perhaps lead to penetration of the skin by ends of bone. The same additional trauma is often due to the awkward efforts of the bystander. A man is struck by an automobile, thus breaking his leg. Except for the broken bone, without displacement, the original injury may be merely slight periosteal tear and mild contusion of soft parts, but he is helped to his feet and the leg gives way, the fragments slide by each other, thus stripping off the periosteum and tearing the muscles. He falls to the ground only to be picked up and carried to the sidewalk, leg dangling. Larger blood vessels are torn, the bone end comes through the fascia, perhaps the skin, even the trouser. He is laid at rest with a coat beneath his head and surrounded by people anxious to help. Someone sees his leg is crooked and straightens it out. The exposed bone end re-enters the wound with a bit of trouser and the dirt of the street. Again, he is lifted up and carried to a car or ambulance. This time, someone carries the injured leg with better intentions than coordination and the ends of the bone are churned around in their bed of lacerated tissues and the contaminating organisms well disseminated throughout the area. During his ride, and in the transfer to the accident ward or the doctor's office, unless he has been carefully splinted, there is more jolting and more damage. Would that his troubles were over but too often the sad story continues. Lack of sufficient protection as he is lifted to and from the X-ray table and as he is being

¹Oration on Fractures presented before the Clinical Congress of the American College of Surgeons, New York, October 22-26, 1931.

anæsthetized, examinations which are too rough or extensive, or repeated, result in still more injury.

Compare this exaggerated picture with a similarly injured man who is allowed to remain where he is until a proper splint can be applied, or at least can have someone pull hard on his foot as he is being lifted and carried, whose examination is thoroughly but gently carried out, and whose treatment is instituted with but little additional injury. The difference in these 2 cases as regards time of disability and amount of permanent functional disturbance is tremendous.

Fractures are not always single. Although it was 20 years ago, I remember distinctly my sensations when I realized that a certain patient, who was recovering from a fractured skull, also had a dislocated elbow. Three weeks was too long a time to elapse before making a diagnosis. People often have multiple injuries. I blush to think of another instance when a man who had broken the shaft of his humerus told me 3 weeks later that he couldn't lift his wrist. My records did not show anything about this detail either before or after reduction and I wondered whether the nerve was hurt when he broke his arm, or whether it happened during my reduction, or whether it was involved later on in the callus formation. *Nerve injuries are sometimes associated with fractures.*

If we could only remember to investigate these matters! But having found what we consider the main lesion, our relief and satisfied curiosity only too often let us stop in our search for facts. Careless or hurried examinations lead us into trouble. And yet, the rough examination, the search for false point of motion and crepitus is, as we have said, accompanied by added injury and a greater problem of repair. The examination should be thorough enough to bring to light the necessary information but gentle enough to cause the least amount of additional injury.

Local reactions to injury begin immediately. In addition to the extravasation of blood into the tissues adjacent to the site of fracture, we find œdema developing within the hour. This adds to the swelling and impedes the circulation. The infiltrated muscular tissue short-

ens and its elasticity decreases, making reduction of displacements more and more difficult. Soon the blood clots and a fibrin network is formed to act as trellis for the new forming connective cells and new blood vessels. The rapidity with which the process of repair gets under way was not understood by that surgeon who is responsible for the old advice "wait 'till the swelling goes down" nor by those many authors and teachers who have handed it on down through the generations. This adage should be replaced by another:

Every fracture should be considered an emergency condition. A broken bone deserves as much consideration of the time element as a ruptured ulcer or an acute appendicitis. Every hour that goes by makes existing displacements more difficult to overcome. The recognition of the need for the early reduction of existing displacements has greatly reduced the time of disability and degree of permanent impairment of function.

The treatment of fractures should be based on a detailed consideration of the anatomy and pathology of each individual case. We are too prone to follow blindly set rules of procedure. We are too apt to say that a Colles fracture should be reduced by such and such manipulations. A certain form of splint should be applied. After so many days it is removed and the patient urged to resume use of his injured extremity. After a thorough examination and a careful study of the X-ray evidence, it should be possible to determine just what procedures are required to restore the fragments to their normal relationship, with the least additional injury. We should also decide by what method this reduction can best be maintained. The plan of campaign should be arranged to solve the problem of that particular case. These plans should include not only the method of reduction but also the method by which the bone fragments are to be maintained in their new position. Don't start the anæsthetic until all necessary preparations have been made and material assembled.

Reduction of displacements should be as gentle as possible. Displacement of fragments is due to the traumatizing force plus the pull

of contracting muscles. To obtain a gentle reduction, an anæsthetic is required to relax the muscles and force must be applied to restore normal relations. Unless this force is applied thoughtfully and carefully, unnecessary additional injury will result. Fragments often have to be disengaged, which may require an increase of the existing deformity. The basic element is usually traction in the axis of the extremity. This often must be aided or followed by lateral pressure to make the fragments engage, but lateral pressure applied before the fragments have been disengaged causes unnecessary injury to the bone ends. The results of our attempts must be checked immediately, first by clinical examination and then by X-ray.

The treatment of fractures subsequent to reduction is a double problem. The injured bone must be protected during the healing process lest the displacement recur. This means rest, relief from strain, immobilization. The injured soft parts must be restored to their normal state as quickly as possible. This means early functional activity and the various forms of physiotherapy. Above all, the circulation of the affected region must be maintained at its greatest efficiency. Methods aimed to protect the bone, delay the soft part recovery and interfere with circulation. Procedures directed toward the latter endanger the bone. The art of treating fractures lies in the adjustment of these opposing indications and in deciding how far we may safely risk one to benefit the other. Only the most general rules can be laid down. The details must be developed to meet individual conditions at each stage of repair.

Traction is most useful in the treatment of fractures. It is the basic principle in reducing displacements. It is also widely applicable in maintaining reduction. But some of the old principles are not understood or forgotten. Continuous traction remains effective only when sufficient countertraction is provided for. Many beautiful banjo splints are applied but the elastic pull is relaxed within 24 hours. In many Balkan frames, the patient slides down until the pull is relieved. The adoption of continuous traction as a means of reduction does not disbar other methods.

If the overriding of a fractured femur is not overcome by traction within 24 to 48 hours it is better to try manipulation than to go on hoping in vain. Soon the callus formation will prevent reduction by any except open method. The amount of traction should be varied with its object. It takes 30 pounds to accomplish a reduction which can then be maintained by 10 pounds. The indication for traction in maintaining reduction is more frequent and more lasting in oblique fractures than in those which are transverse.

The dangers and difficulties of the open method of treatment are greater than those of the closed method. It should be adopted soberly, advisedly, and wisely, and only by those who are willing and able to develop and carry out the special technique involved. It is indicated only when the result, which can be justifiably expected, will be sufficiently better than that to be obtained by other methods, as to warrant the added risk.

The present situation of compensation machinery needs radical change. While it undoubtedly brings financial relief to many injured people who otherwise would be in dire straits, it also prolongs the period of disability for many far beyond what it should and could be. The condition called "compensitis" is often worse than the original injury. It is foolish to expect an individual's disability to stop until his compensation for that disability has been settled.

The general public is overoptimistic about the results of fractures. Their attitude toward the surgeon is much the same as it is toward the obstetrician. If things go well—why of course. But if the result is not perfect—it was the doctor's fault. They do not seem to realize that the original injury may have been too great for a good result. This attitude of mind seems to be especially prevalent among those who make up juries in damage suits. Let us hope that the American College of Surgeons can spread among the public not only gentleness in first aid treatment but broadmindedness in judging our results.

Success depends on intelligent co-operation. In few other fields of surgery is the partnership between surgeon and patient of more importance than in fractures. The surgeon

can do a good deal to help him get well but the result depends even more on the patient's bodily processes of repair and his voluntary acts of co-operation. We cannot do much to aid his process of repair but we can refrain from doing a great deal of harm. We can avoid much unnecessary additional trauma, interference with circulation, too long immobilization and other details. By patient explanation and drilling we can encourage him to carry on—not extensive movements

three times a week, but gentle action every hour and in other ways to do his share of getting back to the nearest approach to normal and at the earliest moment circumstances permit. At the same time we can spare him undue disappointment and ourselves censure by trying to predict the probable outcome. Let us remember the old advice of William T. Bull, to his assistants: "Doctor, if you can't help, for God's sake don't hinder!"