Rib fracture pain and disability

Do we need a more aggressive approach after all?

Rib fractures are the most common injury after thoracic (chest) trauma, accounting for approximately two-thirds of cases. The main challenge in treating them is controlling the associated pain that can lead to complications, such as chest infections and respiratory failure. Despite advances in pain control and anaesthesia, the conservative treatment of these injuries often results in chronic pain, in some cases lasting up to two years after the injury. Dr Benoît Bédat and his team at the University Hospital of Geneva in Switzerland, are currently investigating rib surgery as a more efficient way of treating rib fractures.

Rib fractures are quite common after blunt trauma to the trunk, with motor vehicle crashes and falls being the leading causes. In some cases, they can result in complications such as pneumothorax or haemothorax, occurring when air or blood leaks into the chest cavity, occasionally compressing the lung and leading to respiratory failure unless urgently treated.

In most trauma centres and hospitals, rib fixation surgery is reserved for patients with unstable rib fractures or flail chests – occurring when a segment of the rib cage is ‘floating’ as a result of two or more consecutive ribs fractured in more than two places each.

**CONSERVATIVE TREATMENT IS NOT ALWAYS ENOUGH**

A common dogma among doctors is that pain after rib fractures that have been treated just with pain relief lasts up to six weeks. Unfortunately, this isn’t really the case. There are recent studies describing persistent pain and disability, with up to 76% of patients with uncomplicated rib fractures reporting pain at two months after the injury, and up to 56% of them still complaining of pain six months after the injury. Approximately 13% of patients report that their quality of life is being affected by chronic pain one year after simple rib fractures. Additionally, in another study, 30% of patients with rib fractures that had been managed conservatively with standard pain relief were not able to return to pre-injury employment even two years after their injury. This significant long-term pain and disability has a huge socio-economic impact and is putting increasing pressure on doctors to find and try alternative treatments for uncomplicated rib fracture injuries.

**IS THERE AN ALTERNATIVE?**

A recent American multicentre, prospective, controlled clinical trial revealed that there might be an answer in costal-fixation surgery for uncomplicated rib fractures, especially since it showed an improvement in pain-intensity levels within the first few days after injury. It has been suggested that the possible mechanism leading to the chronicity of the pain after rib fractures is that the initial high-intensity pain might be sensitising the central nervous system to pain perception. Therefore, an early interventional approach to reduce acute pain after rib fractures might improve the outcomes for these patients.

**THE PAROS STUDY**

Dr Benoît Bédat is the principal investigator for the PAROS (Pain After Rib Osteosynthesis) study, a multicentre randomised clinical trial that aims to compare the pain-control effect of rib-fixation surgery to that achieved with just standard medical analgesia in patients with uncomplicated rib fractures. The team’s hypothesis is that costal surgery, on top of the standard analgesia, may further control the pain related to rib fractures. This rationale behind this hypothesis is that costal fixation could lead to reduced inflammation and pain and also less long-term pain and disability issues.

Since the only predictive factor for ongoing pain and disability identified so far is the pain intensity during the first few post-operative days, another study revealed that patients who underwent rib osteosynthesis (rib-fixation surgery) had less post-operative pain and also less long-term pain and disability issues. The only predictive factor for ongoing pain and disability identified so far is the pain intensity during the first few post-operative days.

The PAROS randomised clinical trial, which was conducted in more than 100 centres in the USA, Canada, and Europe, demonstrated that patients who underwent rib osteosynthesis (costal-fixation surgery) had less post-operative pain and also less long-term pain and disability issues. Since the only predictive factor for ongoing pain and disability identified so far is the pain intensity during the first few post-operative days, another study revealed that patients who underwent rib osteosynthesis (rib-fixation surgery) had less post-operative pain and also less long-term pain and disability issues.
The PAROS study uses different rib-fixation devices, including the MatrixRIB™ Fixation System.

nervous injury by restricting and preventing further fracture movement and thus reducing pain.

Since there is no previous study that provides enough evidence to recommend rib fixation as a treatment for uncomplicated rib fractures, the aim of the PAROS study is to investigate the benefits of surgery and the possibility of it becoming an approved treatment option in the future.

More specifically, the team is planning to compare the reduction of pain levels between a patient group that will undergo rib fixation and another one that will be treated with standard medical analgesia alone. The comparison is going to take place at baseline, one, two, three, six and 12 months after injury/surgery. It is of note that PAROS is the only trial so far looking at the long-term effectiveness of the two types of pain management (operative and non-operative) in comparison. The pain will be assessed using specific pain-scoring systems. Surgery is to be performed within five days from the injury, and the team will follow specific inclusion and exclusion criteria. The study will be performed in these tertiary-care hospitals in Switzerland.

Secondary objectives of the study include comparing the amount of pain relief used by both teams, the length of the hospital stay, levels of anxiety and depression related to the injury in both groups, lung function after the injury and finally, the productivity impairment between the two treatment groups against the direct costs of the treatments for the two groups respectively.

CONCLUSION
Rib fractures are a very common injury often associated with immense levels of persistent pain and disability, which have a large psycho-socio-economic impact on patients and our healthcare systems. Although there are many challenges when it comes to the treatment of rib fractures, including the lack of clinical research and evidence, it is quite obvious that the current conservative treatment of rib fractures does not efficiently facilitate pain relief or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities. New methods for treating rib-fracture patients that alleviate pain and reduce disability are urgently required and are expected to have a positive impact – reducing disability or even a prompt return to everyday activities.