

## 外固定

# 弹性外固定和负重治疗胫骨骨不连临床观察

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**摘要:**采用穿针外固定,配合患肢负重功能锻炼治疗胫骨骨不连 22 例。其中,10 例增殖型,12 例萎缩型。究其原因,11 例为内固定不良,4 例为石膏、2 例为自制夹板固定而达不到固定效果,5 例为骨端感染所致。治疗经过 87~189 天,平均 103 天。19 例在 6 个月内愈合,3 例效果欠佳。疗效分析认为:骨不连主要由于不良治疗过分干扰骨折自然愈合过程,骨生长能力受到限制所致。弹性外固定可改善骨折端稳定性,提供弹性和间断生理压应力,不限制功能锻炼中肌泵的供血作用,有利于骨端生长能力的恢复。

**关键词:** 骨不连 骨折外固定器

从 1978 年~1993 年 9 月,我们根据“动静结合”原则,采用骨折弹性外固定法;鼓励患者行患肢负重功能练习治疗胫骨骨折不连接 22 例,取得较好疗效,报告如下。

### 一般资料

本组 22 例中男 18 例,女 4 例;年龄 23~69 岁,平均 42.5 岁;骨不愈合时间为 7~24 个月,平均为 12.4 个月;左下肢 14 例,右下肢 8 例;胫骨上段骨折 2 例,中段或中下 1/3 处骨折 18 例,下段骨折 2 例;骨折不愈合的原因:11 例为内固定不良,4 例为石膏超关节外固定,肢体萎缩或骨端不稳,2 例为自制夹板不能达到固定效果,5 例为骨端感染所致;X 线表现为增殖型 10 例,萎缩型 12 例。

### 治疗方法

在胫骨近段和胫骨远段各穿一枚直径 2.5~3.0mm 骨圆针,利用骨折复位固定器固定骨圆针,如果尚不够稳定可在近段或远段各加一枚骨圆针,针道以无菌纱布覆盖,每周更换一次<sup>[1]</sup>。

1. 治疗前为外固定者,术前解除其他外固定,在局麻或硬膜外麻醉下斜形切断腓骨,给予穿针外固定。

2. 治疗前为内固定者,腰麻或硬膜外麻醉下取出钢板或其他内固定物,骨端无需清理,以骨刀轻轻削剥骨折端周围骨痂及骨皮质,形成所谓“鳞片状植骨”,行腓骨下段斜形截骨术后使用穿针外固定。

3. 有骨畸形者,如为无内固定的单纯成角畸形,在腰麻或硬膜外麻下行闭合折骨术。

有重叠畸形者,切断腓骨,骨折复位固定器穿针固定后行机械牵引复位,如存在瘢痕挛缩,一般无需松解和植皮,多在缓慢机械牵引过程中软化。如为内固定者,则需在手术中取出内固定物,同时矫正畸形。

4. 为感染性骨不连者,感染性窦道可用中药膏换药逐步封口,有死骨者予以摘除,不缝合切口,给予穿针外固定,术后以中药膏逐步换出以达到愈合。

### 结 果

治疗 87~189 天,平均 103 天,除 3 例效果不满意者外余均愈合。3 例中,1 例为胫骨上段粉碎骨折,骨块在外固定下不能消除剪力;1 例有严重的交感性骨萎缩,先经 6 个月穿针外固定效果不明显,后又经夹板固定 2 年半后方自行愈合;另 1 例经穿针外固定 4 个月效果不显著自行出院。

### 典型病例

患者,女,26 岁,病例号 A——2420。1987 年 11 月 9 日被汽车撞伤,左胫腓骨中下 1/3 处开放性粉碎骨折,曾给予清创缝合,钢板内固定,术后骨端感染,5 个月后取出钢板,感染得以控制,但胫骨在伤后 1 年半无愈合迹象,骨端萎缩并缺损(图 1)。1989 年 6 月 27 日在硬膜外麻醉下行左小腿腓骨斜形切断,穿针复位固定器外固定术(图 2)。5 天后扶双拐下地负重行走,3 个月后弃拐负重,同年 11 月 22 日拆除外固定器,骨折达临床愈合,1990 年 1 月复查骨折愈合良好(图 3)。



图 1



图 2

### 讨 论

1. 胫骨骨不连的原因:影响骨折愈合的主要因素是血运和应力<sup>[2]</sup>。但对这两个因素造成不良影响的绝大多数原因是由于治疗技术失当。Frost<sup>[3]</sup>认为 70~80%的骨不连是由于感染,复位不良,过度牵引,骨端剪力或活塞运动幅度过大,以及手术引起的血供破坏等。



图 3

本组病例中,各种内固定引起局部血运不良,过强的应力遮挡以及内固定失败者占 50%,石膏或民间外固定物达不到固定效果者占 27.3%,清创后仍有骨断端感染者占 13.6%。本组 3 例治疗效果不满意者除 1 例为外固定后仍不能消除骨端剪力外,另 2 例均伴有创伤后交感性骨萎缩。

2. 弹性外固定:坚强内固定的应力遮挡作用是公认的,无论是在骨折修复的全过程<sup>[4]</sup>还是在塑形期<sup>[5]</sup>。况且,内固定术后其血运恢复要从 3 周后开始到 12 周时才结束,而骨折端骨密度恢复则需要 1 年半<sup>[2]</sup>。

弹性外固定提供骨折端持续的压应力,使骨折端处于反复吸收——生长——再吸收——再生长的过程,骨折端稳定的嵌合,并互相连接,直至达到骨愈合。

3. 负重功能练习:包含着骨端生理应力的提供和骨端周围血供的建立。肌肉及骨折周围软组织是整复和维持骨折对位的内在固定力。功能锻炼过程中的肌肉收缩、关节活动、合理负重,使骨折端产生一种循环压应力(Cycli

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## Abstract of Original Articles

### Clinical and experimental studies on spondylolithiasis treated by manipulation

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Displacement microsensors were applied to measure fresh cadaver specimens in mimic the displacement in movement and rotatory reduction. It was found that the inferior facet joint of the lumbar spine producing an upward and lateral displacement to enlarge the intervertebral foramen, the vertebral body producing a tendency of relatively backward and retaining to its original position. Through naked eye observation, there was increasing of the width of the isthmus under the action of manipulation of the gap of isthmus. Thirty-five cases of spondylolithiasis were treated by manipulation with satisfactory results, especially for those suffering with degenerative type. It showed that lying in supine position with flexion of knees and hip joints, by rolling the waist, sitting up exercise and iso-tension training are important procedures in therapy.

**Key Words** Spondylolithiasis Bio-mechanics Manipulation Iso-tension training

### Clinical analysis of twenty-two cases of tower-door type of fracture of ankle joint

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Tower-door type fracture of the ankle joint is a rare and intra-articular fracture which is difficult to be treated. Twenty-two cases of such kind of fracture were treated with simple manipulative reduction and application of plaster of Paris as external fixation, prizing dispelling reduction and internal fixation with steel wire, steel wire internal fixation via open reduction, fusion of the ankle joint etc. Better results were gained with prizing-dispelling reduction and internal fixation with steel wire via open reduction. But simple manipulation with plaster of Paris as external fixation and joint fusion had worse results. Pathogenesis of the fracture diagnosis, therapeutic etc. problems were discussed.

**Key Words** Intra-articular fracture Reduction of tower-door type fracture  
Internal fixation with steel wire Joint fusion

### Cartilage callus in bone healing

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Through light microscopic non-decalcified bone histological, histochemical and electron microscopic observations on formation, evolution and ultrastructure of cartilage callus of rabbit radial bone fracture standard defect model during healing process, the results showed that the cartilage callus comes from differentiation of granular tissue of the fracture ends, its formation and reconstruction did not completely similar with ossification in the epiphyseal chondrium. There are five evolutionary stages of cartilage callus cells, the callus under electron microscopic



findings, i. e chondroblasts, chondrocytes hypertrophic chonocytes, degenerative chonocytes and remnant chondrocytes. We realized that 1)the chondrial callus is differentiated from interstitial cells surrounding the fracture end ,2)during reconstruction process, chondrial callus can directly form bone trabeculae. We support the hypothesis that hypertrophied chonocytes. can transfer to bone cells,3)chondrial callus bears important action during healing process. it can fulfil bone defect in the early stage, connect fracture ends, the fracture healing process is completed under the burden of gravity.

**Key Words** Cartilage callus Fracture healing Morphology

### **Experimental and clinical observation on Gao Wu Jia Su Shang Cha Ji in treating acute soft tissue injury**

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Externally applied Gao Wu Jia Su, extract of Chinese herb Gao Wu Tou frost ointment was introduced to treat acute soft tissue injury . Through an observation of animal experiment and 500 patients ,the results indicated that the drug bears better dispelling action of edema, analgesic action and dispelling stasis, and it has no toxic and side—effect. The total effective rate reaches 99. 2%. It is easy to be applied ,so it is an ideal external used drug in treating acute soft tissue injury.

**Key Words** Soft tissue injury Gao Wu Jia Su External therapeutic method with Chinese herb Experimental study Clinical appilcation

### **Clinical observation of elastic external fixation and functional exercise under burder in treating non—union of tibia**

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Twenty—two cases of non—union of tibia treated by external fixation with wire and functional exercise under burder. Among them, 10 cases were proliferative type, 12 atrophic type. The causes of tailure are 11 cases for defext in internal fixation, 4 for plaster of Paris fixator, 2 for self—made splint fixation with bad fixation , and 5 for infection of the fracture ends. Through a course of therapy from 87—189 days, with an average of 103 days, 19 cases healed within months ,3 with worse effectiveness. The result of analysis showed that, the maincause of non—union was due to insufficient therapy interference to natural healing process, with limitation of the ability of bone growth. Elasticexternal fixation can improve the stability of fracture ends, offer elastic and interrupted physiological pressure stress. It dons't limit the blood supply action of the muscle pump during functional exercies. It facilitaes recovery the ability of growth of the fracture ends .

**Key words** Non—union External fixator for fracture