

不同愈合时期的功能训练

根据骨折愈合的不同时期，循序渐进的进行功能训练，一般可分为三个阶段：

第一阶段：伤后1-2周，此时骨折部位会出现局部肿胀并伴有疼痛。疼痛骨折端有血肿，容易移位，软组织损伤需要修复。康复训练的目的在于促进局部血液循环，加速肿胀消退，预防肌肉萎缩和粘连，避免骨质疏松及关节僵硬。

第二阶段：伤后2周-骨折临床愈合，约伤后2-3个月，此时局部肿胀消退疼痛消失，软组织损伤已修复，骨折端日趋稳定。康复训练侧重于增强肌力，扩大关节活动范围。

第三阶段：伤后2-3个月至1年，从骨折临床愈合到骨痂改造塑型的过程已完毕。此期间骨折端已稳定，能耐受一定的应力，患肢的肌肉和关节可进行更大范围的训练。康复训练的目的在于继续加强肌力，扩大关节各方向的活动范围。重新训练肌肉的协调性和灵巧性，以适应生活和工作的需要，重返社会。

功能训练的方式

- 主动运动：活动的全过程均由患者自主完成，这是早期功能康复训练的主要方式，可帮助增强和恢复肌力，也可防止关节僵硬。
- 被动运动：当肢体不能随意活动时，可进行关节的被动活动。被动活动应在无痛或微痛的范围内进行，若有明显的或持续的疼痛均表明有损伤并可反射性引起肌肉痉挛，不利于功能训练。禁止冲击性或暴力性牵拉，以免导致新的损伤。
- 主动辅助运动：当肌肉无力带动关节活动时，给予一定的被动力量作为起点，以弥补肌力之不足，或当主动活动达到当时的最大限度时，为了扩大活动范围，给以有限地外力作为加强，即为主动辅助活动，这种外力可来自患者自己、治疗师、家属或器械。
- 抗阻运动：当肌力已恢复到四级以上，为了增强肌力效果可进行抗阻练习，目前临床上常用渐进性抗阻力训练。



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Fracture Rehabilitation
骨折的康复

What is a fracture?

A fracture is a break in the continuity and integrity of the bone. Traumatic fractures are caused by high force impact or stress, while pathologic fractures are caused by disease that weakens the bone, including cancer, osteoporosis, congenital bone growth defects, and blood disease.

What are fracture symptoms?

- Inherent signs: Deformities, abnormal activity, bone fissures
- General symptoms: Pain, swelling in limbs, tenderness, throbbing vertical pain, limitation of physical activities
- Systemic symptoms: Fever, shock, etc

How do we treat a fracture?

- 1) Restoration: Restoration of the bone to its original placement through joint practices or reconstructive surgery.
- 2) Reduction: Restoration of the bone through corrective alignment, including internal and external alignment.
- 3) Functional exercise: Functional exercise helps to reduce swelling and muscle atrophy, prevent stiff joints, and promote the normal bone healing process.

How does rehabilitation for fractures work?

Rehabilitation after a fracture is an important part of your treatment. Functional exercise can promote blood flow to the veins, improve blood circulation to soft issue and bones, as well as promote the growth of new blood vessels at the fracture site. This sends more of the oxygen required for repair, including essential proteins, calcium, and other substances that encourage the fracture to heal faster. Additionally, these exercises can stimulate the growth of new bones and play an important role in improving and recovering bone function.

Functional training through the phases of healing

The different phases of fracture healing and its progressive functional training can be divided into three stages:

Phase 1: One to two weeks after injury, the fracture site will experience local swelling and pain. Since the injury site is easily shifted, the soft tissue needs to be repaired. The purpose of rehabilitation during this phase is to stimulate local blood circulation, accelerate the reduction of swelling, prevent muscle atrophy and adhesion, and avoid osteoporosis and joint stiffness.

Phase 2: Two to three months after injury, when the swelling and pain have subsided, the soft tissue injury is repaired and the fracture is increasingly stable. This phase of rehabilitation focuses on strengthening the muscles and expanding the scope of what the joints can comfortably do.

Phase 3: Two to three months to a year after the injury, the fracture is healed and the fracture callus transformation completed. During this period, the fracture is stabilized and can tolerate a certain degree of stress, while the limb's muscles and joints can tolerate a wider range of training. The purpose of this phase of rehabilitation is to continue to strengthen the muscles and extend the range of ability for the joints.

Types of functional training

- Active exercise: The entire exercise is done by the patient. This is the main type of exercise for early stage recovery. It improves muscle strength and prevents joint stiffness.
- Passive exercise: Provided when limbs cannot move freely, and includes massage and passive joint exercises. This type of exercise should be performed under no pain or minor pain. It will be stopped if the patient has constant pain or muscle spasms to prevent further injuries.
- Active assisted exercise: This provides support when muscles cannot give the patient enough strength to exercise, or is given to increase the intensity of exercise. This support can be given by the therapist, relatives, equipment, or patient themselves.
- Resistance exercise: After recovery is at a certain level, this is used to progressively improve muscle strength.

什么是骨折?

骨折(fracture)指的是骨或骨小梁的连续性和完整性发生断裂。

外伤性骨折: 直接暴力、间接暴力、肌肉的牵拉、重复暴力
病理性骨折: 肿瘤、骨质疏松、先天性骨生长缺陷、血液病

骨折的临床表现有哪些?

骨折固有体征: 畸形、异常活动、骨擦音

骨折一般症状: 疼痛、肢体肿胀、压痛、纵向叩击痛、肢体功能活动受限

全身症状: 发热、休克等

骨折后该如何治疗?

- 整复(修复): 通过手法或整复外科手术将移位的骨骼整复, 恢复其正常解剖关系。
- 固定: 固定是三大原则的中心环节, 包括内固定和外固定。
 - 内固定包括使用各种不同类型的内固定物所获得的固定。
 - 外固定包括: 石膏固定、牵引、局部夹板固定和外固定架固定等。
- 功能锻炼: 它不仅有利于肿胀消退, 减少肌肉萎缩程度, 防止关节粘连僵硬, 而且能促进骨骼愈合过程的正常发展。

如何进行康复训练?

骨折后康复是治疗骨折的一个重要环节。功能锻炼可促进动脉血通过毛细血管流向静脉, 改善肢体软组织和骨内血液循环, 加速新生血管生长, 增强骨折局部新陈代谢, 供给成骨所需的氧、蛋白质、钙盐及其它物质, 使骨折得以较快愈合。此外功能训练对骨折断端产生的应力刺激是新生骨痂再塑形的重要因素, 对增强骨质、恢复肢体活动功能有着极其重要的作用。