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Editor's Message

Patients with rheumatoid arthritis (RA) nowadays benefit from a variety of biologic agents that have superior efficacy than conventional disease modifying anti-rheumatic drugs. However, RA patients with disease onset before the biologic era may not be as privileged. Chronic deformities of the peripheral joints and cervical joint destruction can be observed in patients with long-standing RA who can benefit from surgical interventions that improve their joint function and reduce physical disability. These patients with multiple joint deformities often raise a concern regarding which joint should be the first to approach in surgical management. In this issue of CHARM, we have the chance to read about traditional Chinese medicine that offer an alternative therapeutic modality for RA patients. We are also delighted to invite a few Orthopaedic surgeons to enlighten us on the surgical approach for RA patients. Dr Steve Cheung and his colleague will tell us how they formulate a management plan for those patients who have multiple joint deformities that warrant surgical interventions. Dr Kenny Kwan will enlighten us about the cervical conditions that may occur in long-standing RA patients and the pre-operative considerations for cervical spine intervention. We will also learn about nursing education for patients who undergo spinal surgery from surgical nurses. A physiotherapist will illustrate by a case study the post-operative physiotherapy management for patients who undergo major spinal surgery. Not to miss reading from our multidisciplinary working partner, the important role of occupational therapist who contribute to better joint function and quality of life of RA patients.

Happy reading!

Common Chronic Joint Deformities in Long-term Rheumatoid Arthritis

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Rheumatoid arthritis (RA) is a chronic deforming polyarticular disease that affects 1% of the general population. This disease is characterized by synovial inflammation and periarticular erosion causing structural deformities of the affected joints. RA leads to significant individual and societal impact as patients with long-term disease suffer from major physical disability.

Subclinical erosive lesions can be detected using high resolution imaging methods such as MRI scan of the inflammed joints as early as 4 to 6 weeks after disease onset[1]. Clinical deformities are evident in the first 3 years of disease presentation highlighting the importance of early diagnosis and effective treatment strategies that target to prevent or retard periarticular erosion. Without proper management, cumulative structural deformities of the upper and lower limb joints in chronic RA are associated with functional impairment affecting activities of daily living.

Common chronic joint deformities in long-term rheumatoid arthritis

RA typically affects the peripheral joints in a symmetrical manner. There are a total of 68 peripheral joints over the upper and lower limbs, together with the temporomandibular joints over the jaws that can potentially be affected by RA. Common clinical deformities of hand joints include swan neck and boutonniere deformities of the fingers, Z-deformity of the thumbs and ulnar deviation of hands[2]. Involvement of the distal interphalangeal joints are typically spared in RA. Distal ulnar involvement with subluxation or ankylosis of the carpometacarpal joints of the wrists are also frequently observed. Chronic RA patients commonly walk with genu valgus deformities. The lateral compartment of the knee is more frequently affected in contrast to osteoarthritis where the weight-bearing compartment is involved. Subluxation of the metatarsophalangeal joints of the foot causes pressure sores over the soles of the foot. Hallucis valgus of the big toes, claw toes or hammer toes are common foot deformities seen in patients with chronic RA raising problem with footwear and gait stability[3]. In addition to synovitis, soft tissue inflammation such as tendonitis and bursitis in patients with early RA may also contribute to joint contractures that may be reversible with commencement of anti-inflammatory drugs for symptomatic relief and effective anti-rheumatic disease modifying treatment (DMARD).

Unlike seronegative spondyloarthropathy, RA does not affect joints of the axial skeleton. Involvement of the atlantoaxial complex (C1/C2) over the cervical spine is an exception and is not infrequently observed in long-term RA. This bony complex consists of three synovial joints which can be affected by pannus in RA[4]. Atlantoaxial problem may not be clinically apparent until in advanced disease when the patient complains of neck pain and upper limb weakness[5]. There may also be a risk to spinal cord impingement from atlantoaxial instability.

The past two decades saw the emergence of biologic agents which offer an alternative option to conventional DMARD in the treatment of active RA. A number of biologic agents have been developed with different molecular treatment targets and have all been shown to be superior in terms of the onset of drug action and potency in the control of synovitis and retardation of structural joint damage. These novel biologic agents have now revolutionized the clinical course of RA such that it would be difficult nowadays to find younger patients with classical hand and foot deformities for MBBS examination !

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中醫針灸推拿在類風濕關節炎治療中的應用

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中醫對類風濕關節炎的理解

中醫於治療類風濕性關節炎已有約兩千年歷史，於古籍中屬「痹證」範疇，又稱「頑痹」、「鶴膝風」、「歷節風」等。近代中醫學家焦樹德則將其命名為「尪痹」，是指表現為遷延不愈、關節變形、骨質受損、出現關節功能活動障礙甚或肢體廢用的疾病 。《黃帝內經》中提及「 風寒濕三氣雜至，合而成痹 」，類風濕關節炎患者多因先天稟賦不耐，加上後天飲食不節、情志失調等間接因素而致人體正氣不足、筋骨失養，再受風、寒、濕等外邪侵襲阻滯經絡而誘發此病，而本病的中晚期則常見肝腎虧虛、痰瘀互結之正虛邪實的病機。

中醫治療類風濕性關節炎可分為內治法及外治法，當中外治法因無須使用內服藥物、操作簡便、安全性高及療效顯著，具有「簡、便、廉、驗」之特點。外治法包括針刺、艾灸、推拿、中藥薰洗等，其中針灸及推拿療法的應用皆十分廣泛。

中醫針灸推拿在類風濕關節炎治療中的應用

類風濕關節炎常用針灸療法及取穴

針刺療法是指通過毫針刺激病變關節附近的穴位，可激發經氣，疏通局部經絡氣血，消瘀行滯止痛。現代研究指出針刺鎮痛是主要通過內源性阿片肽的釋放實現，其在調節機體免疫功能的同時也可在病程中發揮鎮痛作用。針刺療法的取穴主要分為遠端及近端取穴，近端取穴為局部發病關節之鄰近穴位或阿是穴，遠端取穴則常以祛風、散寒、除濕、清熱、通絡、祛瘀為法，佐以扶正，常用穴位包括大椎、膈俞、腎俞、三陰交、足三里等。

此外，針刺療法亦可配合灸法加強治療效果，《針灸資生經》記載：「若針而不灸，灸而不針，非良醫也」，可見灸法與針刺合用的重要性。治療時可於針上放置艾柱點燃，稱為「溫針灸」，取艾草之芳香辛散及火之溫熱升散，可溫通經絡、散寒除痹、調和氣血陰陽，激發人體所需之正氣。現代病理學亦觀察證實，灸治能減輕關節滑膜細胞的充血水腫、炎細胞浸潤、滑膜細胞增生、組織增生等滲出性病變，從而達到抗炎和增強免疫力。除溫針灸外，亦可於穴位上使用「隔薑灸」，生薑有溫養脾陽、溫經散寒、回陽通脈、祛風寒濕的功效，可通過其揮發油和辛辣成分作用於機體，以取抗炎、抗風濕、改善局部血液循環之效。

推拿手法緩解類風濕關節炎症狀

除針灸外，中醫推拿亦常用於治療類風濕關節炎，眾多臨床研究均證實推拿治療對縮短患者晨僵時間、減輕關節腫痛和改善功能障礙等方面具有一定成效。推拿的常用手法包括推、一指禪、滾、揉、拿、點、按、擦、抹、搖、抖、運、搓、拍打、捶、拔伸等，治療類風濕關節炎則可根據患者病變關節採用臨近取穴的方法選取穴位，使用按摩揉搓手法以溫經散寒、推擦拍擊等法以活血祛瘀，及使用運動關節類手法滑利關節、矯正畸形並恢復關節功能，亦可根據病情結合外用中藥熏洗治療。

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Surgical Intervention for Peripheral Joint Deformities in Rheumatoid Arthritis

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Rheumatoid arthritis is a severe inflammatory disease causing multiple joint pain and stiffness across the whole body, especially in the peripheral limbs. The mainstay treatment options include analgesics and anti-inflammatory agents for pain control, disease modifying agents and biologics for disease control, and surgical intervention for failed pain control and to improve long-term functional outcome.

There are 2 main indications for surgical intervention for peripheral joint deformities. The first is for pain control. Rheumatoid arthritis causes severe inflammation of the soft tissue in the joints, particularly in the synovial joints, with chronic inflammation leading to pannus formation. The treatment options include synovectomy (removal of the synovium – though it is less commonly used nowadays), arthrodesis (fusion of the joint), or joint replacement. The other indication for surgery is to correct joint deformity and improve the functional status of the patient. In the upper limbs, inflammation of the joints lead to soft tissue damage and tendon rupture. This results in ulnar deviation of the wrist as well as the metacarpophalangeal joints and the inter-phalangeal joints. Chronic patients develop the characteristic “rheumatoid” hand signs, including Swan Neck deformity, Boutonniere deformity, and Z-thumb, due to tendon rupture as part of the chronic inflammation process. In the lower limbs, inflammation and joint erosion leads to deformity in the hips and malalignment of knees. In the foot and ankle, inflammation leads to deformity in the metatarsophalangeal joints (MTPJ), as well as other deformities including hallux valgus and claw toes. The result of these deformities leads to decreased range of motion, which in turn leads to stiffness and long-term disabilities in the functional and mobility status.

Surgical Intervention for Peripheral Joint Deformities in Rheumatoid Arthritis

The sequence for surgical intervention may be variable between patient to patient, but there are some principles one should follow. Urgent orthopaedic conditions that are life threatening and can cause neurological deterioration such as C1/2 subluxation must be managed first. Other orthopaedic conditions that have improved outcomes with earlier surgical intervention include release for carpal tunnel syndrome, repair for ruptured or pending ruptured tendons, excision of infected or painful rheumatoid nodules. Following management of these semi-urgent conditions, thorough discussion with the patient is necessary to understand the references and expectations they may have. Often, patients prefer to tackle the most painful joint first, as this usually causes more limitation in function than the actual deformity. If the patients do not have a preference, the first procedure would be recommended to be a simple yet highly successful procedure that can gain the patient's trust and confidence, termed the "winner" procedure[1]. As this is the start of a long-term doctor-patient relationship, it is important to establish a strong trust before the surgeon move on to other larger operations such as knee or hip replacements for the patients. An example of a "winner" procedure is arthrodesis of the 1st MTPJ for hallux valgus.

It is arguable whether surgical intervention for the upper or lower limbs should take precedence. Early surgical intervention for the upper limb may help the patient regain ability to be independent in their activities of daily living as well as having good functional use of walking aids in their subsequent rehabilitation from the lower limb operations. The counter argument is that early surgical intervention for the lower limbs may allow patients to mobilize earlier and prevent joint stiffness in the lower limbs, which is a major barrier to regaining good mobility status post-operatively.

For the lower limb, surgical intervention should be made for the foot and ankle joint before intervention for the hip joint. The knee joint should be the last lower limb joint to undergo surgical intervention. There are several advantages to this sequence. Many of the operations for the foot and ankle joint would befit the criteria needed for a "winner" procedure as aforementioned. Also, a stable and plantigrade foot would create a good mechanical basis for subsequent hip and knee operations to measure their alignment from. Lastly, foot deformities often lead to pressure ulcers, which may increase the risk of subsequent infection if joint replacements are performed. Prioritizing hip replacement surgery before knees allows good hip flexion range of motion intra-operatively for positioning, as well as post-operatively in the rehabilitation phase.

For the upper limb, the movement of the shoulder and elbow allows the hand to be maneuvered to any point within a 3-dimensional sphere around the user, meaning that its importance in upper limb function is far greater than that of the wrist and digits. The shoulder provides a circular range of motion with the help of the rotator cuff muscles, whereas the elbow controls the relative distance between the user and the object. As such, early surgical intervention for the shoulder is required before total loss of rotator cuff muscles[2]. Also, while elbow movement can be compensated by moving closer or further away from the object, no movement can substitute the function of the shoulder. Therefore, shoulder replacement surgery should be prioritized before elbow replacement surgery. After the shoulder and elbow, a painless, stable and good functional wrist sets the foundation for further reconstruction of the hand. Therefore, surgical intervention for the wrist should be prioritized over that of the digits. Treatment of the wrist deformities may be prophylactic (such as fusion of joints before they sublux) or corrective (fusion or arthroplasty)[3]. For the digits, reconstructive surgical options include tendon transfer for ruptured tendons and fusion for dislocated joints.

Once the patient's confidence has been established, it may be beneficial to combine multiple surgical interventions in one anesthetic setting, for example, a one-stage bilateral knee arthroplasty or one-stage ipsilateral shoulder and knee replacement. This has proven to be more advantageous in reducing patient suffering, saving operating time and shortening overall hospitalization and period of rehabilitation.

Overall, these recommendations serve as guiding principles for surgical intervention for patients having rheumatoid arthritis with multiple joint deformities and is not a one-size-fit-all blueprint. The outcome and sequence of the operations should be tailor-made for each patient after understanding each patient's needs and expectations.

Figure 1
X-Ray of knee affected by rheumatoid arthritis showing complete eburnation of medial and lateral cartilage and diffuse osteopenia.

Figure 2
X-Ray showing post total knee replacement.

Surgical Intervention for Peripheral Joint Deformities in Rheumatoid Arthritis

Figure 3
X-Ray of Right total hip replacement

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Management of cervical spine problems in rheumatoid arthritis

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Introduction

It is reported in the literature that up to 86% of rheumatoid arthritis (RA) patients have cervical spine involvement, especially among those with inadequate medical treatment[1]. The underlying pathology is related to the chronic inflammation of the synovial joints between the cervical vertebrae, bone erosion, and consequent ligamentous laxity that results in radiological and clinical instability. The three commonest cervical pathologies encountered in RA patients are: (1) atlantoaxial instability; (2) cranial settling; and (3) subaxial instability. Clinical presentation of these problems comprises a spectrum of symptomatology from incidental finding on imaging screening, neck pain, occipital headache, numbness, motor weakness to frank paralysis and incontinence. Hence, high index of suspicion, careful clinical examination, and appropriate imaging are required to manage RA cervical spine problems adequately.

Atlantoaxial instability

The most common site of involvement is at the atlantoaxial region where the C1/2 articulation is infiltrated with chronic inflammation and pannus forms at the joints that leads to bone destruction. The normal atlantodental interval (ADI) should be less than 3 mm in healthy adults. As the ADI increases, the space available for the cord (SAC), i.e. the distance between the posterior border of the dens to the anterior aspect of the posterior C1 arch, reduces, thus compressing on the spinal cord. An ADI that exceeds 8 mm is suggestive of rupture of the transverse and alar ligaments[2], and surgery is recommended. A cut off of 14 mm of SAC is associated with better neurological recovery after surgery, whereas poorer outcomes were observed when patients had a SAC of less than 10 mm before surgery. Open mouth and dynamic views are important to assess the presence of rotatory subluxation and reducibility of the subluxation. A pre-operative CT scan is useful in determining the bony anatomy and architecture for pre-operative planning, and a MRI is important to delineate the level of compression. Surgical management requires posterior decompression by excision of the posterior C1 arch, and fusion of the C1/2 with screws and rods if the bony anatomy allows, or extension to the occiput cranially and subaxial spine caudally if needed.

Management of cervical spine problems in rheumatoid arthritis

Figure 1
Lateral radiograph showing atlantoaxial subluxation. The anterior atlantodental interval (yellow) is increased, whilst the space available for the cord is reduced.

Cranial settling

Progressive atlantoaxial instability results in vertical migration of the odontoid into the cranial cavity, resulting in cranial settling. Patients may present with occipital headache as the occipital nerves passing between the atlas and axis are compressed. Brainstem compression and vertebral artery compression can result in tinnitus, vertigo, visual disturbance, diplopia and dysphagia. When the tip of the odontoid lays more than 4.5 mm above the McGregor line, which is a hypothetical line drawn between the hard palate and the most caudal point of the occipital curve on plain radiograph, CT and MRI should be obtained for these patients. Such patients will require a period of halo traction to gradually reduce the cranial settling, as the skull is gradually reduced to bring the cervico-medullary angle back to 135o. The MRI will also detect any concomitant compression of the spinal cord that needs to be decompressed. Finally, an occipito-cervical fusion with instrumentation will be required for these patients.

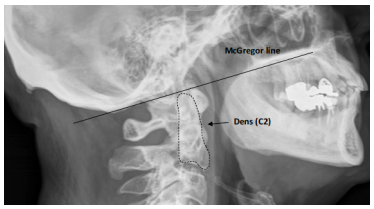

Figure 2
The McGregor line

Subaxial subluxation and deformity

Subaxial subluxation involves C3 to C7 instability where inflammation of the apophyseal joints, intervertebral discs and interspinal ligaments leads to anterolisthesis of the vertebrae. When multiple levels are involved, a "staircase" deformity is observed. Complex deformities with local kyphosis or even kyphoscoliosis can be found in RA patients. There is often concomitant cervical cord compression with symptoms of myelopathy, including hand clumsiness, weakness, numbness, gait disturbance and sphincter dysfunction. These patients will require surgical decompression to rescue their neurology, internal fixation and fusion to stabilize the spine, and deformity correction.

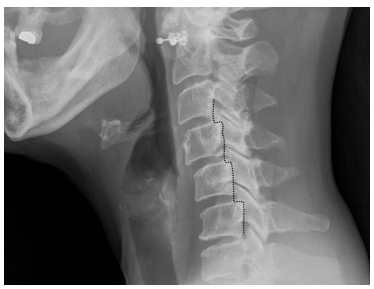

Figure 3
"Staircase" deformity : Subaxial subluxation involving multiple levels

Overall management

RA patients receive multiple pharmacological therapies that may interfere with wound healing, and intraoperative bleeding. Their skin may be thin and bone quality is poor if they have previous corticosteroid use. In general, they may have a high frailty score. Hence, preoperative counselling, and multidisciplinary assessment by anesthetists, rheumatologists, physiotherapists, occupational therapists are essential before the patient undergoes surgical intervention. Despite the best efforts, complications such as wound infection, delayed or non-union, implant failure, and residual functional deficits are still high. As other joint involvement may hinder postoperative rehabilitation, clear goals and planning are required for successful outcomes.

Nonetheless, with advances in medical therapies for RA, the incidence of severe cervical spine involvement is reducing. Good compliance is therefore essential to reduce the rate of surgical interventions.

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Nursing education to assist patients during the recovery period after spinal surgery for degenerative pathologies

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Adults aged ≥50 years frequently develop degenerative spinal pathologies, which can be managed by various surgical interventions. The indications for spinal surgery for degenerative conditions have recently broadened[1]. Individuals undergoing such procedures frequently have mobility issues due to postoperative discomfort[2], leading to anxiety and depression[3]. Therefore, prompt delivery of nursing guidance during recuperation is essential. For continual education of health professionals, this article addresses patient education on the expected postoperative nursing care in spinal surgery after patient discharge from hospital to home.

On postoperative day 1, patients can typically stand and walk after recovery from anesthesia. Patients are advised to slowly return to activities of daily living and avoid vigorous activities for the first 6 weeks postoperatively. Walking is the most appropriate type of exercise which should be gradually increased during the recovery period depending on the patient's condition. Patients' energy level and ability to exercise increases during the rehabilitation period, and most patients fare well 4 months after spinal surgery.

Neuropathic pain is problematic for patients and can be relieved by medications[4]. Deep tissue swelling can cause pressure at the surgical site leading to compressive effect on nerves or other tissues. Swelling and associated discomfort can be relieved to some extent by applying ice to the skin for 20 minutes every hour[5]. A clean cloth can be used as a protective barrier.

Patients are generally advised not to carry heavy loads to prevent injury[6]. For instance, patients undergoing cervical fusion surgery should avoid lifting loads over 10 pounds and above the head for the first 6 weeks postoperatively. Similarly, patients undergoing lumbar fusion, decompression, or discectomy should not lift weight above 10–20 pounds.

Additional care should be taken while twisting or bending the body as these movements may add tension to the surgical incision and lead to wound dehiscence, ruptured sutures, or hemorrhage. Loss of wound closure increases the risk of infection. Twisting, bending, and lifting increase the risk of disc herniation, especially if the disc was subjected to excessive tension during the recovery period. De novo bone formation after surgical fusion procedures is highly susceptible to the effects of increased stress.

Wounds should be monitored daily by the patient or care provider. Generally, steri-strips are applied to the wound, which is then covered with Tegaderm dressing. Tegaderm dressing is water resistant but not waterproof. Therefore, patients are advised to take shower and avoid bathing in a tub or submerge in water. The surgical incision is typically evaluated by a trained nurse and the surgeon 2–3 weeks postoperatively. If wound healing is satisfactory, the sutures or staples can be removed. The patient should avoid soaking the wound for 24 hours after suture or staple removal. If skin hypersensitivity to the dressing material occurs, such as skin irritation, erythema, or blistering, patients are advised to remove the dressing. Such hypersensitivity cases should be reviewed by a qualified nurse for further management.

If the patient take excessive physical activities before complete wound healing, dehiscence associated with hemorrhage may occur at the surgical site. Occasionally, modest fluid or seroma accumulation in the deep tissue may extravasate superficially, cause leakage at the incision site, or rupture deep sutures, leading to bruising or blood collection within the tissues. Seromas or hematomas of sufficient size can induce discomfort and act as a locus of infection. In cases of marked leakage or bleeding from the wound, additional assessment by a wound specialist is necessary[7].

The location of a leak can be identified by asking the patient to assume a supine position on a fresh ABD pad for 5–10 min; the location of the stain reveals the bleeding site. Additional external sutures can be considered by the surgeon. Mild fluid or blood loss can be managed by reducing patient physical activity and applying pressure to the wound in conjunction with ice pad application. The surgeon may also prescribe prophylactic antimicrobial agents to prevent infection.

Signs of infection include pyrexia, malaise, redness, heat, and pus leakage from the wound. In such cases, several blood tests, including complete blood count and C-reactive protein assays are needed for further investigation. If infection occurs in patients undergoing hardware implantation during spinal surgery, the physician may consider additional procedure to debride and clean the wound[8].

Patients receiving analgesics should avoid driving a vehicle because their reaction times, muscle strength, and coordination may be impaired. To avoid compromising the surgical site and circumvent any likelihood of accidents, patients are advised not to drive for 7–14 days postoperatively. This may be modified according to the complexity of the procedure.

The surgeon usually provides advice regarding how patients should sleep. Generally, a firm and supportive mattress is required to maintain spinal alignment. A thin pillow is recommended after neck surgery. Additionally, placing a pillow under the knees can facilitate relaxation of the paraspinal musculature and diminish tension on the nerves. When patients turn in bed, they should try to keep their spine in a neutral position by turning their shoulders and hips simultaneously to avoid placing the spine under any torque. When rising from the supine position, patients are advised to assume a lateral position initially, which prevents tension on the surgical area during motion. When lying down, the opposite should be performed, i.e., patients should lie on their side and then rotate to the supine position.

Nursing education to assist patients during the recovery period after spinal surgery for degenerative pathologies

A competent surgical nurse should provide information to patients requiring spinal surgery and encourage them to play an active role in their recovery. Offering patients detailed information prior to intervention facilitates seamless transition between hospital and home care settings after discharge[9].

The information given in this article, albeit not fully comprehensive owing to the spectrum of possible spinal surgeries, will enable health professionals including nurses to feel empowered to assist patients during their recovery from a psychological perspective.

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Post-operative physiotherapy for patients with spinal cord injury
- a case sharing: from bed-bound and ventilator-dependent to walking with exoskeleton

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Introduction

Physiotherapy management after spinal surgery for patients without major neurological conditions is usually quite straightforward. On the other hand, patients with high-level cervical cord injury commonly suffer from poor respiratory function with ventilator dependence, lack of mobility, heavy burden of care and poor quality of life after surgical intervention. With technological advancement, the introduction of diaphragm pacing system (DPS) and robotic exoskeleton has provided great potential to significantly improve the respiratory and mobility functions of patients with high-level cervical cord injury.

A Case Sharing

A 31 year-old lady with C2 fracture and spinal cord injury was treated with combined anterior/posterior spinal fusion and tracheostomy, and remained tetraplegic and ventilator-dependent post-operatively. The patient received implantation of DPS two months post-injury.

Diaphragm Pacing System

The NeuRx™ DPS involves laparoscopic placement of intramuscular electrodes in each hemidiaphragm near the insertion motor points of the phrenic nerve. External electrode wires are connected to a pulse generator that delivers stimulation at an intensity and rate individualized for each patient leading to diaphragm contraction and hence assists respiration[1].

Physiotherapy Management Framework

The physiotherapy management framework for DPS is built based on our previous experience in taking care of ventilator-dependent patients. We mainly focus on respiratory, musculoskeletal and functional aspects with various stages of progression aiming to maintain, improve and significantly advance physical function of the patient:

i) To Maintain and Improve physical function

Adequate conventional respiratory physiotherapy including manual respiratory techniques such as percussion, vibration and tracheal suctioning; and musculoskeletal physiotherapy including passive limb mobilization, bedside prop-up and active/passive lower limb ergometry with early caregiver training are essential to stabilize and maintain the physical condition of the patient. To enhance the respiratory function for this patient, we combined DPS with the established respiratory physiotherapy interventions including mechanical in-exsufflation, suctioning and inspiratory muscle training with the threshold device to work in respiratory optimizing cycles. After the caregiver had attained enough competence, we progressed with additional gym physiotherapy sessions including various active mobilizing and strengthening exercises, mobility training, vasomotor training including passive and active standing and functional training[2].

ii) To Significantly Advance physical function

a) Respiratory

This patient gradually weaned off the ventilator completely with full time pacing at 7 months post-DPS. With the progression of respiratory function and reduction in secretions, we intensified the interventions with trials of spontaneous breathing and inspiratory muscle training without diaphragm pacing as tolerated, and had even gradually weaned off mechanical in-exsufflation, suctioning and tracheostomy completely.

b) Mobility

As the patient had incomplete tetraplegia with progressive neurological recovery, we had further offered her 16 sessions of robotic exoskeleton training. A dramatic improvement in her severe orthostatic hypotension was noted with exoskeleton training. Despite having C2 spinal cord injury, the patient required significantly less vasopressors and lower level of assistance for active standing and transfer activities[3].

Such respiratory and mobility breakthroughs significantly decreased the burden of care on the caregivers and the patient was successfully discharged home at post-DPS 30.5 months after progressive discharge planning and caregiver training from our multidisciplinary rehabilitation team.

Conclusion

The early implementation of such advanced technologies to an appropriately selected tetraplegic patient could result in significant improvement in respiratory and mobility function, enhanced morale and quality of life. Such improvement can also significantly minimize the burden of care on the caregivers and facilitate progressive discharge and home care planning.

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Occupational Therapy for Rheumatoid Arthritis

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Rheumatoid arthritis (RA) is an inflammatory arthritis and may affect multiple joints. It usually affects the body symmetrically and begins in the small joints of the hands and feet and spreads proximally over time. Key symptoms include pain, joint swelling, stiffness and muscle weakness and can lead to difficulties with daily activities like grooming and dressing, cooking, cleaning, shopping, work and leisure activities. RA often affects these activities of daily living. Occupational therapy (OT) can address these concerns and provide interventions to manage RA patients.

OT interventions were classified into six specific categories: 1) training of motor function; 2) training of skills; 3) instruction on joint protection; 4) counseling; 5) advice and instruction on the use of assistive devices; and 6) provision of splints. It is regarded as a "comprehensive program" when all six intervention categories are part of the treatment. Prescription of assistive devices and provision of splintage, training of self-care activities and productivity activities are the three most often chosen interventions by occupational therapists for RA patients (Melvin 1998).

Splints/Orthosis

Joint deformities may affect the wrist and hand as a result of disease damage to intrinsic and extrinsic structures. Typical presentations include ulnar drift of the metacarpophalangeal joints, Boutonnière and swan neck deformities in the fingers. An orthotic intervention prescribed by an occupational therapist is usually one component of a comprehensive joint protection and self-management programme (Hammond 2013). Orthoses for osteoarthritis (OA) and RA are frequently used to decrease pain, minimize deformities, decrease inflammation, decrease stress to the joints, provide support for increased function, and assist with joint. The common orthoses include resting hand splints, wrist supports, finger splints, and special splinting protocol before and after reconstructive surgeries.

The NICE osteoarthritis clinical guideline (NICE 2014b) recommends people with OA who have biomechanical joint pain or instability should be considered for assessment for bracing/joint supports/insoles as an adjunct to their core treatments. (Recommendation 1.4.8) The SIGN rheumatoid arthritis guideline (SIGN 2011) also recommend a resting and working splints for pain relief. (Recommendation 7.2.4)

Assistive Technologies

The concept of assistive technology includes devices, guidelines and practices that aim to maintain, enhance or facilitate the performance of meaning occupational in self-care, educational, employment or social activities. Among the range of instruments available to patients with RA, the adaptations of utensils/equipment and the use of orthotics are some of the major resources to improved grip, joint alignment and stress reduction.

According to the NICE Clinical Guidelines on Osteoarthritis: care and management, Assistive devices (for example, walking sticks and tap turners) should be considered as adjuncts to core treatment for people with OA who have specific problems with activities of daily living. (Recommendation 1.4.9)

The adaptation of equipment requires a thorough analysis of the activities performed by the patient in order to determine what are the main challenges encountered and the possible solutions to be proposed. The modifications may include changes the way of conducting the activities (such as guidance on joint protection and energy conservation) to changes in the shape, weight and size of utensils/equipment. Examples may include grab rails and other supportive equipment to assist getting up and down, wheeled carts, suitcases and storage devices to avoid unnecessary lifting, compression sleeves that can support the joints, and splints to cushion, reinforce, or ease joint movement.

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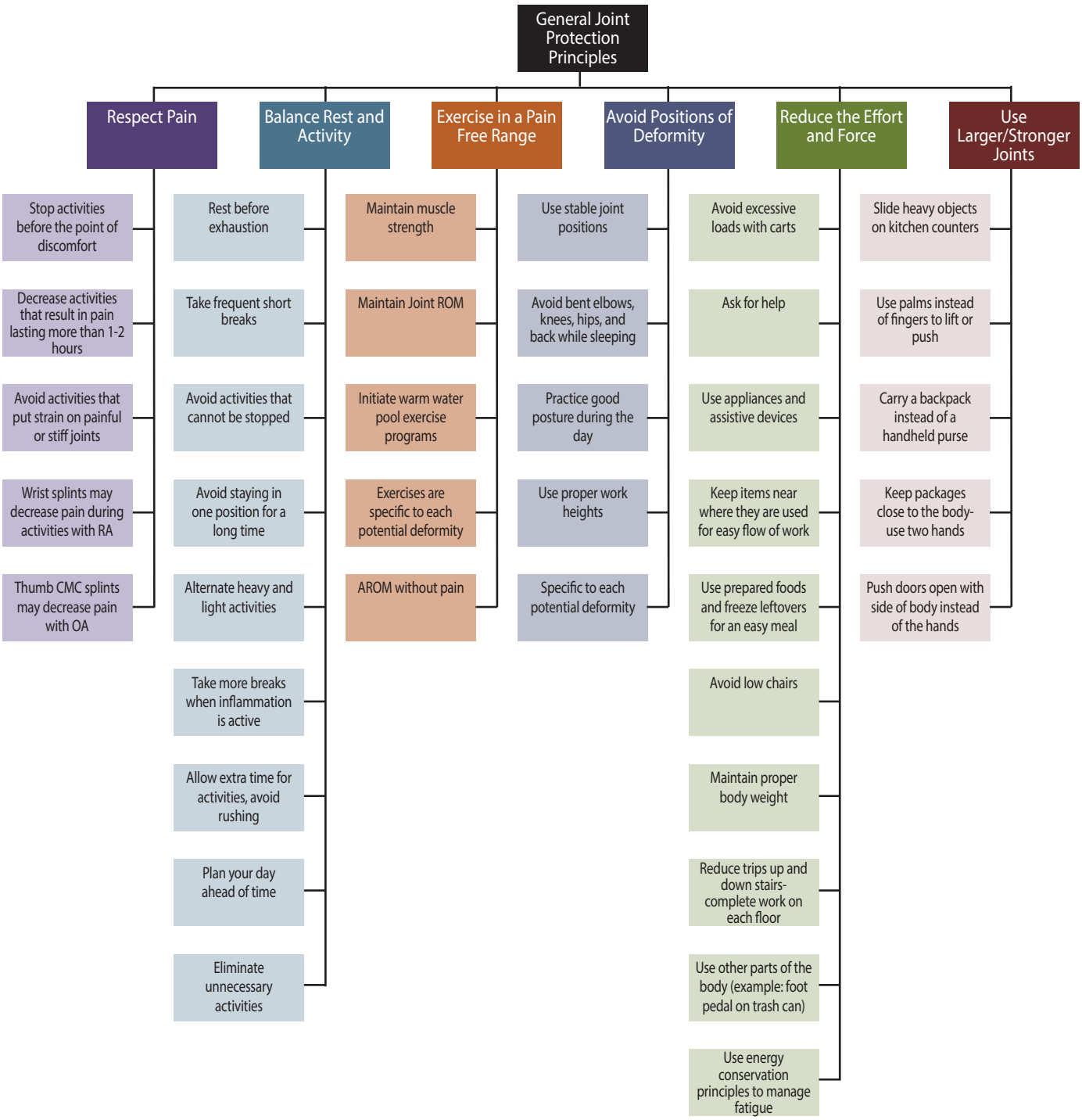
Joint Protection and Energy Conservation

Research has shown that joint protection can help to reduce pain and make everyday activities easier. Joint protection techniques are a set of guidelines and strategies used in the management of pain and fatigue and other symptoms in patients with RA by apply ergonomic and biomechanical principles to protect joint structures that may contribute to deformities or aggravate the established deformities (Table 1 shows the general principles). Through the analysis of motor impairments and application of biomechanical principles, joint protection aims to minimize the action of forces that induce the development of joint deviations and deformities during performing ADLs. Modifications in ADLs performance allow a significant reduction in joint stress and energy expenditure which can facilitate or enable the patient to participate in meaningful occupations.



Courtesy from Beasley J, Osteoarthritis and Rheumatoid Arthritis: Conservative Therapeutic Management, Journal of Hand Therapy 2012;25:163-72

Occupational Therapy for Rheumatoid Arthritis

Exercise

According to The National Institute for Health and Care Excellence (NICE), a tailored strengthening and stretching hand exercise programme delivered by a trained practitioner is recommended for adults with RA. The Strengthening and Stretching for Rheumatoid Arthritis of the Hand Trial (SARAH) shows that a tailored hand exercise programme is a worthwhile low-cost intervention that serves as an adjunct to various drug regimens and doubled the treatment effect in important areas of overall hand function, activities of daily living, work, satisfaction (as measured by MHQ subscales) and confidence to self-manage symptoms. In a 2020 study, researchers found that exercise was a safe and effective way to increase cognitive function and decrease fatigue for patient with RA. An exercise regimen should form part of the management plan for patients with this condition.

Summary

Occupational therapy is a rehabilitation aimed at restoring, maintaining and developing individual skills necessary for daily activities, work and leisure of people who have lost the ability to take care of themselves. It is recommended to intervene in the early stages of the disease in the rehabilitation of RA patients to increases likelihood of maintaining their independence in everyday life by increasing muscle strength, reducing pain, preventing deformities and increasing tolerance to physical activities.

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