脊柱旋转手法治疗腰椎间盘突出症的实验研究

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摘 要 采用模拟手法对3具新鲜尸体的脊柱标本,进行了$L_{4,5}$、L_5S_1椎间盘后外缘应力变化的测定,和脊柱不同位置变化下腰椎小关节突相互关系改变的观察。结果发现前屈侧弯旋转法对腰椎小关节突的活动幅度最大,直立旋转法次之,向左侧旋转时小关节突作切面的旋转滑动,右侧小关节间隙增大;向右侧旋转时反之。做前屈侧弯旋转法时,当脊柱向左侧旋转时,椎间盘左后外侧压力增高,同时右后外侧压力减低;向右旋时则反之。而当旋转动作结束复原时,出现负压的一侧均出现一个微小的正压,这种正负压力多次反复的变化,可以使突出的髓核变位或变形,从而使受压的神经根减张。

关键词 腰椎间盘突出症 按摩疗法 生物力学

国内目前广泛采用脊柱旋转手法,包括直立旋转法(侧扳)、坐姿旋转法治疗腰椎间盘突出症,但对其机理的研究甚少,我们对3具新鲜尸体的脊柱标本,做了模拟手法下$L_{4,5}$、L_5S_1椎间盘后外缘应力变化的测定及脊柱不同位置变化下腰椎小关节突相互关系改变的观察。

力学测定

1. 实验仪器:

(1)传感器,采用航天航空部634所传感器部研制的PVT—2型压力传感器,传感器厚度0.8mm,探头面积10×10mm,共2个传感器。

(2)电荷放大器,采用扬州无线电二厂产2个FDH—7型电荷放大器。

(3)记录仪,采用四川仪表厂产LZ3—304双导函数记录仪。

2. 实验准备:

(1)取3具新鲜尸体,其年龄分别为25岁、42岁、56岁,均为男性。经解剖取出脊柱部分(包括骶髂关节),剔除椎旁肌肉,保留各个韧带,做成标本,并将骶骨固定于铅杯中,用塑料袋密封,放入低温冰柜备用,实验时取出,自然化冻。

(2)实验前2个传感器经标定后,其引线分别接在2个电荷放大器上,电荷放大器接双导记录仪,在准静态下调节电荷放大器,将2个传感器信号调成一致后,分别把传感器插入$L_{4,5}$或L_5S_1间盘的左右后外缘,硅胶封闭纤维环,并将传感器插入后的压力定为零。

3. 实验结果:

(1)前屈侧弯旋转(坐姿旋转)法:固定铅杯,施手法者一手扶住S_1或L_5棘突,另一手扶颈椎,先前屈脊柱,然后匀速作最大幅度的脊柱侧弯及旋转(左旋、右旋),同步记录椎间盘左、右后外缘的应力变化曲线,并算出力值,3具尸体所测得力值见下各表。

表1 25岁男尸前屈侧弯旋转时椎间盘后外缘力值(g)

	$L_{4,5}$				L_5S_1			
	左旋45°	左旋90°	右旋45°	右旋90°	左旋45°	左旋90°	右旋45°	右旋90°
左	25	50	−60	−130	25	55	−50	−110
右	−50	−110	40	60	−45	−100	25	60

表2 42岁男尸前屈侧弯旋转时椎间盘后外缘力值(g)

	$L_{4,5}$				L_5S_1			
	左旋45°	左旋90°	右旋45°	右旋90°	左旋45°	左旋90°	右旋45°	右旋90°
左	30	53.3	−49	−110	29	50	−45	−110
右	−50.2	−120	30.1	50	−45	−100	30	50

表3　56岁男尸前屈侧弯旋转时椎间盘后外缘力值(g)

	$L_{4,5}$				L_5S_1			
	左旋45°	左旋90°	右旋45°	右旋90°	左旋45°	左旋90°	右旋45°	右旋90°
左	40	80	−45	−91	40	60	−40	−86
右	−45	−90	40	70	−40	−90	36	50

从以上各表可以看出，做坐姿旋转手法时脊柱左旋椎间盘左后外侧压力增高，同时右后外侧压力减低，向右旋时则反之。从记录的应力变化曲线图中测得，每当动作结束复原时出现负压的一侧均出现一个微小的正压。

(2)直立旋转(即侧扳手法)：固定铅杯，在颈椎椎体处水平方向穿入斯氏针一枚，施手法者抓住斯氏针，进行脊柱左右旋转，同步记录椎间盘左、右后外缘的应力变化，结果记录的应力分布无明显规律性。

(3)前屈、后伸：前屈时左右侧均出现负压，但力值甚微。后伸时与前屈相反。

动态观察

将上述实验尸体$L_{1\sim5}$的左右侧小关节突上钉上金属小钉，在电视X线下观察腰椎在前屈、后伸、左右侧弯、直立旋转、前屈侧弯旋转时小关节突的活动情况，并将观察情况点片。

1. 前屈、后伸：前屈时，L_5S_1小关节首先开始活动，以后依次为$L_{4,5}$、$L_{3,4}$…小关节活动。活动时以上关节突为支点，下关节突沿关节切面作旋转运动。后伸时这种关节面旋转运动与前屈相反，但由于解剖结构关系，旋转幅度较前屈为小。

2. 左右侧弯：左侧弯时，以左上关节突为支点，左侧下关节突稍有向下滑，右侧下关节突向上移动，右侧弯时与左侧弯相反。

3. 直立旋转：脊柱向左旋转时，各小关节突以左侧为支点，右侧小关节突的关节面不同程度张开，关节间隙增大，其中以$L_{4,5}$小关节张开幅度最大。

4. 前屈侧弯旋转：左侧前屈侧弯旋转时，左右侧下关节突的关节面作旋转运动，随着侧弯旋转动作，以左侧上关节突为支点，下关节突继续作关节面的旋转，左侧下关节突稍向下滑(较单纯侧弯小)，右侧下关节突向上移动，并且关节间隙增大。右侧前屈侧弯旋转时则相反。

以上观察可以看出前屈侧弯旋转时，小关节活动幅度最大，直立旋转时次之。

分析与讨论

我们通过在新鲜尸体上模拟手法，观察手法时$L_{4,5}$、L_5S_1椎间盘后外缘的应力变化、腰椎小关节突的形态变化，发现前屈侧弯旋转(坐姿旋转)手法对腰椎小关节的活动幅度最大，直立旋转(侧扳)手法次之，向左侧旋转时，右侧小关节间隙增大，向右侧旋转时，左侧小关节间隙增大。由于小关节突的反复活动，关节囊的伸缩，改变了椎间孔的形态和大小，可松解神经根周围的粘连。冯天有[1]在脊柱内、外平衡失调学说中指出，腰椎间盘突出患者多伴有脊柱之间的微小位置变化和生物力学变化，并证实这种微小的"错位"是可以纠正的。通过本实验，我们认为前屈侧弯旋转手法和直立旋转手法在治疗中均起到调节脊柱之间的微小位置变化的作用。

章莹[2]等在尸体实验中测得在前屈侧弯旋转手法时髓核内压增高，因此认为手法不能使突出的髓核还纳，本实验在测量手法对椎间盘后外缘应力变化时发现前屈侧弯旋转动作时，椎间盘的后外缘一侧压力减低，这就给髓核的还纳创造了一个有利的条件，再加上大幅度旋转活动时，纤维环和后纵韧带发生紧张、扭转和牵拉，可使一部分外层纤维环完整，髓核尚未退化的突出髓核还纳或部分还纳。但由于手法后脊柱又回复到手法前的体位，动作完成后压力减低的一侧椎间盘后外缘又产生正压，所以又可将已还纳或部分还纳的髓核再次挤出，这种正负压力多次反复的变化，可以使

突出的髓核变位或变形，从而使受压的神经根减张。对髓核已变性的突出，髓核还纳的可能则更小。因此，我们认为脊柱旋转手法治疗腰椎间盘突出症时髓核完全还纳的可能性很小，而变位和变形的可能性最大，当髓核已变性，则手法疗效较未变性者差。

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二仙肾气汤治疗老年性胸腰椎骨质疏松症

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从1986年起，我们用二仙肾气汤治疗老年人胸腰椎骨质疏松症引起的胸腰背痛，取得了较好的效果，现将资料完整的117例总结如下。

临床资料

本组117例中男16例，女101例；45岁至50岁2例，51岁至60岁16例，61岁至70岁71例(男7例)，70岁以上28例(男9例)；临床表现：胸痛或腰背疼痛为本病的主要症状，疼痛进行性加重，严重者不能起床活动12例，疼痛向肋缘放射或臀部和下肢放射19例，脊柱运动受限94例；本组病例均作胸椎或腰椎X线摄片，表现为：椎体的骨质密度普遍性减低，骨皮质变薄，骨松质的小梁变细、减少，排列呈纵行栅栏状。椎体出现鱼尾样双凹形或楔形改变，椎间隙增宽呈梭形。

处方与用法

仙茅10g 仙灵脾10g 熟地黄15g 山药10g 山茱萸10g 泽泻10g 茯苓10g 丹皮10g 肉桂3g 附片5g 当归10g 川芎10g 青陈皮各5g。水煎服用，每日一剂，20天为一个疗程。

临床运用随症加减：阴虚火旺引起的骨蒸潮热、盗汗、舌红少津、口干脉细数者加黄柏、知母；气短乏力，舌淡肥边缘有齿印，脉细数者加黄芪、党参；头晕心悸，舌淡脉细无力者加鸡血藤、鹿角胶；疼痛如锥刺或抽掣样加蜈蚣、全蝎；疼痛随天气变化，阴雨寒冷加剧，得暖减轻者加川草乌、细辛。

疗效标准及结果

疗效标准：显效：疼痛症状消失，恢复正常工作或日常生活活动，本组73例；有效：疼痛症状显著减轻，日常生活能自理，本组39例；无效：治疗一个疗程后无明显改善，本组5例。

体 会

我们以祖国医学肾主骨生髓，髓充则能健骨和治肾亦即治骨的理论为指导，从肾气丸中得到启发，自拟二仙肾气汤对本病进行治疗，效果良好。本组中无效5例中后来诊断为骨转移肿瘤4例，多发性骨髓瘤1例。本方主要功效是温补肾阳。我们的临床运用表明，凡是肾阳不足或阴阳两亏的老年性骨质疏松症患者，均可以本方灵活化裁。

China J Orthop & Trauma 7(5),1994

Abstract of Original Articles

Experimental study on Gu Bao Wan in treating rachitis

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In this article, changes of serum calcium, phosphorus, alkaline phosphatase, 25—hydroxy—vitamin D3, bone tissue morphology and bone metrology were observed in treating rachitic rats with Chinese medicine Gu Bao Wan pre— and post—treatment and they were compared with Vitamin D3. The results indicated that Gu Bao Wan is effective in the prevention and treatment of rachitis, especially it has prominent effects in the elevation of serum calcium, phosphorus, and decreasing of serum alkaline phosphatase and in the promotion of mineralization of osteoid. But it is different from the mechanism of Vitamin D3.

Key Words Rachitis Gu Bao Wan Prevention and treatment

(Original article on page 5)

Laboratory study of rotatory manipulation in the treatment of lumbar intervertebral disc protrusion

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The stress changes on posterior lateral edges of L_{4-5}, $L_5 - S_1$ discs and the positional alternates of articular processes of lumbar facet joints were measured while mimicing rotatory manipulations were performed on three spinal specimens from fresh cadavers. The study showed that rotatory manipulation with anterior and lateral flexion allowed a greater range of motion between articular processes of lumbar facet joints than straight rotatory manipulation. There was a sliding movement between articular processes while the spine was rotated. The interarticular space of the right facet joint was increased when the spine rotated to the left and vice versa. The sliding movement between the articular processes can adjust the position of lumbar vertebra. The pressure was increased at the left posterior lateral site of the disc and was decreased at the right posterior lateral site of the disc while the spinal specimen was rotaed during flexion to the left, and vice versa. Negative pressure would be changed to positive at the end stage of rotatory manipulation. Such kind of repeated changes of pressure will change the position and shape of the protruded nucleus, and modification of the pressure on the nerve root would be happened.

Key Words Lumbar intervertebral disc protrusion Manipulation therapy Biomchanics

(Original article on page 7)

Experimental study on the influence of anti－bending force of the femur of senile rats with Fu Fang Wu Ming Yi Chong Ji

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Thirty－two twelve months old senile rats were divided randomly into four groups with eight in each group. Subjects in the experimental group were feeded with food and Fu Fang Wu Ming Yi Chong Ji (pyrolusite diluent, Chong Ji). The subjects in control group were feeded with food only. All of them were sacrified at 18－month old. Bending destroyed load and thickness of femoral cortex were measured. The results indicated that the bending destroyed load of both sex of the rats and average cortex thickness were prominently higher than the control group($p<0.05-0.01$). In both experimental and control group ,the bending destroyed load of male rats was prominently higher than that of female one's($p<0.01$). This indicates that Chong Ji bears the action of prevention and delaying onset and developing of osteopo－rosis. In the same age group, bone loss of female rats are relatively evidently than that of male ones.

Key Words Osteoporosis Wu Ming Yi Chong Ji Biomechanics

(Original article on page 10)

Integration of traditional Chinese and modern medicine and intramedullary treatment of fracture of femoral shaft

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Three hundred and sixty five cases of fracture of femoral shaft were treated with integration of traditional Chinese and modern medicine. A comparative analysis and exploration of these two methods were carried on in order to better application in the treatment of fracture of femoral shaft.

Key Words Fracture of femoral shaft Traditional Chinese medicinal therapy Fixation of fracture, intramedullary

(Original article on page 12)

Enhanced clamp fixator in the treatment of fracture of olecranon

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Two hundred and ten cases of fracture of olecranon were treated with enhanced clamp fixator. There were a rate of anatomical or near anatomical reduction of 97.6% after a follow－up period from three months to eight years. It is realized that the instrument can be used in any type of fracture of olecranon, the key point is to select suitable fixating point based on different types of fracture.

Key Words Fracture of olecranon Enhanced clamp fixator Fracture fixator

(Original article on page 21)