· 理论研究 ·

从“筋骨、痹痿、虚实、动静、刚柔”
谈膝关节炎功能障碍的特点郭洁梅^{1,2}, 陈 鹏², 蔡唐彦¹, 肖 艳², 毛 骁², 苏友新^{2*}

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摘要 膝关节炎(KOA)属于进展性骨关节病,其功能障碍主要表现为膝关节疼痛、僵硬、屈伸行走不利或受限,以及关节失稳、运动控制下降和本体感觉低下等。我国 KOA 患者众多,且还在逐年增加,引起的功能障碍严重影响着患者健康与生活质量,因此对其开展康复的研究与实践至关重要。中医康复着眼于功能,注重辨证康复,是我国康复医学的固有特色及优势。前期的研究基于 KOA 功能障碍的中医证候表现,本研究经大量文献梳理及多年临床实践,从“筋骨、痹痿、虚实、动静、刚柔”5 个角度为切入点,提出 KOA 功能障碍具有“筋骨同病、痹痿并见、虚实错杂、动静失衡、刚柔失常”5 个基本特点。鉴于 KOA 功能障碍具有早、中、晚三期的阶段性特点,在该病发生发展的不同阶段,其功能障碍在“筋骨、痹痿、虚实、动静、刚柔”之间的表现又各有所侧重。本研究从“筋骨同病、痹痿并见、虚实错杂、动静失衡、刚柔失常”5 个方面分别阐释了 KOA 功能障碍的特点:“筋骨同病”侧重于病位,是 KOA 所致功能障碍的基本病机特征,贯穿于其发病的始终;“痹痿并见、虚实错杂”偏重病性,是 KOA 功能障碍的基本特点;“动静失衡”偏重病因,是引起 KOA 病情反复及加重的重要因素;“刚柔失常”则是兼具病状与病因,是膝关节失去“骨正筋柔”的表现方式,也是 KOA 功能障碍的重要特征。本研究旨在进一步完善 KOA 的中医康复理论,为其康复治疗提供参考。

关键词 膝关节炎; 功能障碍; 筋骨同病; 痹痿并见; 虚实错杂; 动静失衡; 刚柔失常

膝关节炎(knee osteoarthritis, KOA)是中老年人常见的慢性、进展性骨关节疾病。据统计我国 KOA 患病人数已达 1.1 亿,其最终致残率高达 53%,故对其开展康复的研究与实践至关重要^[1]。中医康复在中医辨证论治和整体观念的指导下,不仅着眼于患者的整体功能,还强调辨证康复观,是中国康复医学的固有特色和优势。纵观以往研究, KOA 中医康复理念的提出大多是基于现代医学的病理变化,虽也有学者提出“痹痿并治”“本痿标痹”“从筋论治”“从痹论治”等策略^[2-6],但鉴于 KOA 功能障碍

的阶段性特点及痹痿、标本间轻重程度的差异,似乎还无法体现中医辨证康复与标本缓急兼顾的康复理念。中医古籍中没有“膝关节炎”这一病名的记载,一般认为其归属“膝骨痹”的范畴^[7-9],虽然其中“鹤膝风”“膝痛”等病名并不能与 KOA 完全等同,但其相关内容能为 KOA 临床康复治疗提供借鉴。本研究团队经大量文献梳理及多年临床实践,认为 KOA 功能障碍具有“筋骨同病、痹痿并见、虚实错杂、动静失衡、刚柔失常”等特点。现阐释如下,以为其中医康复治疗提供参考。

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1 KOA 功能障碍中的筋骨同病

《说文解字》曰：“筋，肉之力也。从力、从肉、从竹。竹，物之多筋……腱，筋之本，附着于骨。”《素问·五脏生成篇》曰：“诸筋者，皆属于节。”筋具有络缀骨骼、构成关节、协助运动的生理功能。骨为干，具有支撑形体、保护五脏六腑、贮藏骨髓和主管运动的生理功能。正如《素问·痿论篇》所言：“宗筋主束骨而利机关也。”筋为骨的活动提供动力，骨靠筋的伸展和收缩实现屈伸及运动功能；骨是筋舒缩运动的附着与支撑，筋靠骨的支架作用才能协助完成肢体的各种运动^[10]。筋骨相连，互相支撑，构建起了筋骨系统，是维持人体运动系统力学平衡的关键元素，对关节的结构稳定与功能发挥都起着重要作用。《素问·长刺节论篇》提到“病在筋，筋挛节痛，不可以行，名曰筋痹……病在骨，骨重不可举，骨髓酸痛，寒气至，名曰骨痹”。筋骨任何一方的异常势必导致筋骨关系的失调，从而影响关节的结构与功能。

从 KOA 功能障碍的主要病理表现来看，软骨退化、滑膜炎症、软骨下骨重塑异常是 3 个主要病理^[8]，很明显前两者归属于中医筋病范畴、后者属于骨病范畴，属于筋骨同病，故《素问·脉要精微论篇》云：“膝者筋之府，屈伸不能，行则倮附，筋将惫矣。”《诸病源候论》曰：“肾居下焦，主腰脚，其气荣，润骨髓。今肾虚受风寒，故膝冷也。”研究已表明，KOA 功能障碍可能早期起于筋病，如滑膜炎症在 KOA 中占重要地位，在早期滑膜炎症就参与 KOA 的发病过程，炎症产生大量细胞因子，导致软骨退化加剧^[11]。持续的滑膜血管扩张、充血、水肿、渗出以及后期滑膜纤维化、碎片化等，成为 KOA 继续进展的主要因素，表明滑膜炎症不但会引起 KOA 疼痛，还会出现关节积液，引起关节活动异常等其他功能障碍^[12]。从生物力学角度分析，在滑膜炎症与软骨退变基础上引起的关节肿胀、畸形等功能障碍^[13]，不但削弱关节周围软组织发挥应有柔韧与约束功能的结构基础，导致膝关节失去稳定性及应力束缚，还诱发关节软骨下骨的重塑异常，继之发生骨质改变；反之，骨端增生、硬化、疏松等不但会影响关节的应力分布与传递，还进一步刺激滑膜、韧带等产生炎症反应，也会影响关节软骨代谢及生物学功能。总之，KOA 不仅存在骨端硬化、增生及疏松、囊状变等“骨”的病理表现，还存在关节软骨退化、关节囊（滑膜）炎症及肌腱、韧带退变等“筋”的病理表现^[10]，属于“筋骨同病”。因此，KOA 具有明显“筋骨同病”的特点，筋骨同病是 KOA 所致的疼痛、僵硬、屈伸行走不利等功能障碍的基本病机特征，贯穿于其发病的始终。

2 KOA 功能障碍中的痹痿并见

普遍认为 KOA 发病不外三端：年老体衰、肝肾亏虚、筋骨失荣，长期伤损、肢节瘀滞、筋骨失养及感受外邪、经络痹阻、筋骨失健^[14]。就病因而言，KOA 除了“风寒湿三邪杂至”及瘀血阻滞的“痹”的因素，还明显伴有肝肾亏虚、荣养不足“痿”的因素，具有引起“痹痿”同病的病因基础。不仅如此，以上 KOA 3 种病因之间又可互相影响，肝肾亏虚、筋骨失荣，外邪更易乘虚侵袭；肝肾不足，推动乏力，也易导致血瘀；撞击闪挫、筋骨伤损、瘀血内停，不但影响筋骨肢节的荣养，还易引起外邪侵袭局部，即“瘀久化风”；感风寒湿邪，痹久可损伤正气，还可成痰致瘀，并进一步加重肝肾亏耗，正如《医学入门》提出“痹久亦能成痿”。由此可见，引起痹与痿的因素还互相影响，互相促进，终致痹痿并见。

结合 KOA 的病理表现分析，将 KOA 存在的骨端增生、滑膜炎症、腘窝囊肿、韧带附着点炎症等归属于“痹”，将膝周肌肉萎缩无力、关节软骨退化、骨端骨质疏松、关节囊退变、韧带松弛等归属于“痿”，绝不是主观臆测，故 KOA 的主要病理也涉及“痹痿”两端。从功能障碍的角度分析，将膝关节疼痛、僵硬、屈伸活动受限等 KOA 功能障碍归为“痹”，将行走或登梯无力、关节失稳、运动控制及本体感觉下降等 KOA 功能障碍归为“痿”，也绝不显得牵强附会。虽然在 KOA 不同阶段，其痹的表现有在筋、在骨及寒、热等区别，其痿的表现也存在骨、肉、筋的差异与侧重^[8,15]，但总的来看，痹痿并见是 KOA 功能障碍的基本特点，也贯穿于其发病的始终。

3 KOA 功能障碍中的虚实错杂

如前所述 KOA 发病不外感受外邪、劳伤瘀滞、肝肾亏虚三端，任一端均可独立致病，但以两者或三者共同致病为多，此为病因层面的阐释。通过进一步对病因的分析，我们可以发现此三端本身就具有虚实属性，感受外邪、劳伤瘀滞属实，肝肾亏虚为虚，并且在虚实之间会互相影响。外邪侵袭、劳伤瘀滞可以影响筋骨濡养，使其容易伤损而影响肝肾功能，导致肝肾亏虚；肝肾不足，筋骨衰弱，易受外邪侵袭及伤损。正如薛己《正体类要》云：“筋骨作痛，肝肾之气伤也。”《张氏医通》曰：“膝痛皆因肾虚，虚受风寒湿而为之。”所以，从 KOA 功能障碍病因角度分析，存在着虚实错杂的特点，而此虚实病因所致的功能障碍也具有虚实特点，这提示我们从康复病因的预防层面要注重虚实的两重性。

从 KOA 功能障碍具体表现看，早期风寒湿瘀等

实邪致病,闭阻经络肢节,不通则痛,所致膝关节局部疼痛剧烈,甚则痛不可触,关节僵硬,屈伸不能,行走困难等,以实证表现为主,除膝关节局部症状外,还可伴寒湿痹阻所致腰身重痛,湿热痹阻所致口渴不欲饮、烦闷不安等全身实证证候。但此期除实证表现还同时可伴见肝肾不足所致的局部畏风恶寒、下肢酸软无力以及腰酸耳鸣、潮热盗汗等虚证表现,为实中夹虚。中后期随着病程进展,正邪交争日久,外邪入里损耗气血,加上本有之肝肾不足,加剧了经络肢节失于濡养,不荣则痛,表现为膝关节疼痛隐隐、缠绵难愈、喜温喜按,并伴见筋肉、骨节、形体瘦削,行走无力,步履困难,以虚证表现为主,还可伴有肝肾亏虚、气血虚弱所致的全身乏力、自汗盗汗等全身虚证证候。此期虽以虚为主,但亦可见一些实证表现,如关节局部变形隆起、压痛,甚至灼热、肿胀等,为因虚致实,虚中夹实。晚期由于肝肾筋骨虚极,痰瘀流注,膝关节疼痛不仅表现为日间隐痛,也常表现为后半夜刺痛疼痛,关节僵硬并伴随关节畸形及骨端周围的软组织萎缩,为虚极夹实。因此,虚实错杂是 KOA 功能障碍的基本病性特点,贯穿于全程。

4 KOA 功能障碍中的动静失衡

膝关节的动静平衡有两层含义,一是结构性动静平衡,二是功能性动静平衡。结构性动静平衡是由静力平衡系统及动力平衡系统构成。其中,静力平衡系统由股骨下端、胫骨上端、髌骨、半月板、韧带等结构组成,提供膝关节静力性稳定。动力平衡系统由股四头肌、腘绳肌等膝关节周围肌群组成^[16-17],提供膝关节动力性稳定。功能性动静平衡是指膝关节活动的劳逸结合即运动与休息科学合理,功能性的动静失衡即劳逸失度,包括过度运动、超生理范围活动、长时间的单一姿势、有害的关节受力以及关节长时间无活动、无负重等,均会导致关节结构性动静平衡系统的损害,引发并加重 KOA。

从病理角度看,KOA 存在明显的结构性动静系统的失衡,这种失衡经常始于静力平衡系统的破坏,如关节软骨的磨损、碎裂,半月板的损伤、撕裂,骨端的增生,关节囊与韧带的松弛、褶皱等,导致膝关节间隙不均、狭窄,部分区域应力集中,膝关节活动范围的缩小或异常活动等,继之出现动力平衡系统改变,如股四头肌的萎缩退化无力,主动肌与拮抗肌的协调性破坏,对膝关节运动的保护作用下降。动力平衡系统紊乱反过来又加重静力平衡系统的破坏,这包含“筋不束骨”的本质。从功能活动角度看,KOA 常存在明显的动静失衡问题,如经常登梯

或登山者、蹲跪工作者、负重行走者、长时间站立不动者,即《素问·宣明五气篇》所说“久坐伤肉,久立伤骨,久行伤筋”之类,以及膝关节长时间被固定无负重者,都是 KOA 的好发人群。另外,在 KOA 的病程中也存在动静失衡问题。发病前期膝关节活动存在过动、过劳现象;在发病后期,又存在过静、过逸的情况,这种动静失衡是引起 KOA 病情反复及加重的重要因素。总之,动静失衡既是 KOA 功能障碍的原因,也是重要的表现特点。

5 KOA 功能障碍中的刚柔失常

《诗经·大雅》云:“柔则茹之,刚则吐之。”《素问·阴阳应象大论》曰:“审其阴阳,以别柔刚,阳病治阴,阴病治阳。”“刚柔”是表示事物性质既对立又统一的哲学概念,与“阴阳”有异曲同工之妙,被应用于中国古代医学原理的阐述。叶天士将刚柔理论与脏腑、药性相联系,赋予其刚柔属性,如“凡脾胃为柔脏,可受刚药;心肝为刚脏,可受柔药”。《类经·论治类》亦指出:“形证有柔刚,脉色有柔刚,气味尤有柔刚。柔者属阴,刚者属阳。”关节者,周身运动之枢纽、机关也,关乃肢节与肢节相交之处,节为两骨之端,关节由筋骨相连而成,兼具筋骨柔韧刚强的特性;从现代解剖学层面而言,关节由关节囊、关节腔以及关节相关的骨构成,当中有坚固的骨组织,也有柔韧的软组织,因此关节是刚柔属性兼具的结构,构成关节刚柔相济的特点。刚有强健之性,柔有柔和之性^[18],两者看似相差迥然,却又不可分割而论。膝关节作为人体最大构成最为复杂也最为巧妙的负重关节,以骨为刚,以筋为柔,刚柔相济是其发挥正常功能的重要前提。当骨组织、韧带、肌肉、关节液等组织结构处于健康状态时,骨骼劲强、韧带有力、肌肉强健、滑液润泽,共同维系膝关节“骨正筋柔”的正常形态,膝关节发挥正常负重、屈伸功能。

在 KOA 状态下,膝关节刚柔相济的平衡状态被打破,“骨正筋柔”被打乱,具体表现为:早期软骨退化,滑膜炎症萌发,滑液分泌增多,韧带及关节囊附着点的炎症导致筋挛拘急,失去柔顺。中后期软骨退化加重,关节间隙狭窄,韧带及关节囊出现松弛、韧性下降,肌肉萎缩,筋束骨失能导致骨节失稳,骨端增生、硬化,甚至呈现畸形等骨刚正异常表现,随着病情进展韧带肌肉萎缩持续加剧伴发骨质疏松、骨端囊状变,骨组织脆性增加,骨失刚强、肌筋疲极,屈伸行走负重不能,功能丧失。总之,刚柔失常是膝关节失去“骨正筋柔”的表现方式,也是 KOA 功能障碍的重要特征。

6 小 结

综上所述,从筋骨同病、痹痿并见、虚实错杂、动静失衡、刚柔失常5个方面分别阐释了KOA功能障碍的特点,“筋骨同病”侧重于病位角度的阐释,“痹痿并见、虚实错杂”偏重病性角度的阐释,“动静失衡”偏重病因角度的阐释,而“刚柔失常”则是兼具病状与病因的阐释。因此,在制定KOA康复方案时,自然要兼顾这些特点,根据其不同病程阶段“筋骨、痹痿、虚实、动静、刚柔”之间的侧重,综合选择针对性的康复方法,提高康复效果。

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Bibliometrics and Visual Analysis of rTMS in Recent Five Years Based on CiteSpace

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ABSTRACT Objective: To summarize the current research status, hot spots and their evolution trend through bibliometrics and visual analysis of the latest research on repetitive transcranial magnetic stimulation (rTMS) conducted in recent five years at home and abroad. **Methods:** The related literatures search of rTMS during 2015-2019 were conducted in CNKI and Web of Science (WoS). CiteSpace software was used to analyze the co-occurrence analysis of authors, countries and institutions, and keywords; conduct cluster analysis, time evolution analysis and Burst analysis on keywords, and draw the knowledge map. **Results:** A total of 996 articles were obtained from CNKI search, of which Zhang Tong, the author who had the most publications; the most published papers were from the School of Rehabilitation Medicine, Capital Medical University. A total of 2,086 literatures were obtained from WoS search. Jonathan Downar had the most publications. The most published country was the United States, and the high degree of center was Portugal. The research hotspots in the field of rTMS at home and abroad mainly focus on the treatment of mental illness such as depression and schizophrenia, the research on the cognitive sequelae of cerebral apoplexy, the recovery of motor dysfunction, and the exploration of the mechanism of action of each functional area of cerebral cortex. It was predicted that this field would continue to study its influence on brain region function and further reveal its mechanism in the future. **Conclusion:** CiteSpace software was used to visually analyze the research literature of rTMS in recent five years at home and abroad, which directly reflected the current research status, hot spots and their evolution trend of rTMS. It provided some references for the topic selection and future direction of rTMS research.

KEY WORDS repetitive transcranial magnetic stimulation; CiteSpace software; bibliometrics; visual analysis

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Dysfunction Characteristics of Knee Osteoarthritis with the Conception of "Muscles and Bones, Arthralgia and Flaccidity, Asthenia and Sthenia, Dynamic and Static, Hardness and Softness"

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ABSTRACT Knee osteoarthritis (KOA) is a progressive disease, which is mainly manifested by knee joint pain, stiffness, restricted flexion and extension, joint instability, decreased motor control, and low proprioception. KOA significantly impacts an individual's overall health and quality of life. The increasing incidence rate of KOA in China indicates the importance of related rehabilitation research and practice. Traditional Chinese medicine (TCM) rehabilitation places an emphasis on the function and differential diagnosis, which has inherent characteristics and advantages for KOA treatment. Based on previous literature and clinical TCM knowledge of KOA dysfunction, our research team summarized KOA syndromes into five categories: "comorbidity of tendons with bones", "coexistence of arthralgia and flaccidity", "mixture of asthenia with sthenia", "imbalance between dynamic and static statuses", and "disorder between hardness and softness". At different KOA stages, the comorbidity of tendons with bones is the basic pathogenic characteristic of KOA dysfunction, which focuses on disease location and extends throughout the KOA process; coexistence of arthralgia and flaccidity, and mixture of asthenia with sthenia emphasize the basic characteristic of KOA dysfunction; imbalance between dynamic and static statuses is the main factor of KOA relapse and aggravation, which focuses on KOA etiology; disorder between hardness and softness emphasizes both syndrome and etiology, indicating the disorder between bones and tendons. TCM rehabilitation theory for KOA and serves as a reference and clinical guidance for its rehabilitation treatment. The analysis attempts to further improve the TCM rehabilitation theory for KOA and provides a reference for its rehabilitation treatment.

KEY WORDS knee osteoarthritis; dysfunction; comorbidity of tendons with bones; coexistence of arthralgia and flaccidity; mixture of asthenia with sthenia; imbalance between dynamic and static statuses; disorder between hardness and softness

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