The McMurray’s Test-A Historical Perspective

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Abstract

One of the most prominent and widely used orthopaedic physical examination tests for detecting meniscal tears in the knee is the McMurray’s test. Throughout its lifetime it has undergone subtle transformations based largely upon the interpretation and application of the clinicians and researchers. Here, we pay tribute to the test and chronicle its historic path into modern day clinical practice.

Keywords: McMurray; Knees; Meniscal testing

The Classic History of McMurray Test

For 90 years, the McMurray’s test has been widely used in orthopaedic physical examination to aid in the diagnosis of meniscal tears. In addition, while the test’s rendering has undergone many transformative alterations since TP McMurray’s original inception, its moniker remains unchanged. The purpose of this historical perspective is to chronicle the test’s variations since its 1928 debut in hopes to provoke discussion amongst contemporary authors, scholars, and researchers to consider using the term “modified” to precede McMurray’s test when warranted.

T.P. McMurray was revered amongst his colleagues as a prominent general and orthopaedic surgeon/lecturer at Liverpool University. He was president of the British Orthopaedic Association, president of the Liverpool Medical Institution and, at the time of his death in 1949, president-elect of the British Medical Association. In 1928, McMurray designed a test intended to provoke meniscal tears of the external cartilage or posterior horn of the internal cartilage. Its performance required the practitioner to passively fully flex the knee followed by either external or internal rotation of the tibia. He stated, “In using this method the knee should be flexed completely, so that the heel rests on the buttock or as near this point as possible; the ankle is then grasped in the right hand, and the joint controlled by the left hand with the thumb and forefinger firmly grasping it on either side at the level of the joint to its posterior aspect, and behind the external and internal ligaments respectively. The ankle is now twisted by the hand, so that the knee is rotated inwards and outwards to its fullest extent, and if a lesion of the external cartilage or of the posterior portion of the internal cartilage is present a definite click can be felt under the finger or thumb of the left hand” [1].

McMurray offered his first modification to the original test in 1934. This modification included the addition of abduction/adduction with knee extension [2]. The basis provided for this modification was to replicate the mechanism of injury more closely. Most authors who describe McMurray’s test define it in this form; however, cite it incorrectly as the 1942 version.

By 1942, McMurray again altered his original test by incorporating passive knee extension to a right angle from full flexion following the end of tibial rotation. The component movements of abduction and adduction were removed without any rationale provided. He described it as advancement from the test’s first iteration because it now assisted the practitioner in diagnosing tears from the middle portion of the meniscus to their posterior attachments [3]. Although the 1942 version is the most commonly cited form of the test, most authors vary in their descriptions by including knee extension beyond 90° and/or the use of abduction and adduction.

On July 15, 1948, McMurray described his final test modification in his lecture to the Royal College of Surgeons of England. In this rendition the test begins with the knee and hip fully flexed, followed by either external or internal tibial rotation, and ending with the knee and hip brought down to an extended position. He noted, “During these movements any abnormality of the semilunar cartilage can be defined not only in regard to its presence but also the site and extent of the lesion can be judged from the occurrence of a distinct painful click constantly occurring at the same point of extension” [4]. This modification would be McMurray’s last due to his subsequent passing in 1949.

Throughout the 1940s, two contemporaries of McMurray make note of his test in their publications. Dr. Reginald Watson-Jones and Major Bernard Mintz both mention McMurray’s 1934 version and herald it as a useful examination technique, however, failed to properly cite him in their references [5,6]. Dr. Watson-Jones also took the added liberty of requiring the operator to rock the knee side to side with abduction and adduction forces while the knee remained fully flexed with either of the tibial rotations. If this was not provocative, he then advanced his maneuver by imparting knee extension. At no point in his description did he refer to this as a modification.

One of the largest documented modifications of the McMurray’s test occurred during the 1950s. In 1954, Dr. Philip Lewin not only replaced the terms of abduction/adduction with valgus/varus, but also discarded McMurray in his references [7]. In addition, he repeats a second stress to the medial meniscus after completion of the lateral meniscus stress. He neither cited McMurray nor labeled his maneuver as a modification. Two years later Dr. Harold Childress not only reiterated McMurray’s test from 1942, but also properly referenced him [8]. He was the first to do so since McMurray’s passing. In the following year, Dr. John Norcross paid McMurray similar homage by describing the test just as documented in his paper from 1948 [9]. While Norcross did not properly cite McMurray, he is the first to refer to the test’s “click” response as McMurray’s sign.

In April of 1969, Dr. Leon Gillis reprised the 1934 rendition of McMurray’s test [10]. Like many of his predecessors, Gillis failed to cite McMurray in his references. Later that same year, Dr. T. J. Fairbanks acknowledged the test’s variation and recommended the use of additional maneuvers to provoke meniscal tear presence [11]. His account included the use of tibial circumduction at varying degrees of knee flexion while applying a varus or valgus force. He also suggested that tibial traction may be helpful. Again, McMurray was never cited.
The 70s brought with it a notable account of the McMurray’s test. In 1976, Dr. Stanley Hoppenfeld also described the test’s application in his widely used text Physical Examination of the Spine and Extremities [12]. Unfortunately, he did not cite McMurray and biased the test solely toward the medial meniscus. He also recommended to internally and externally rotate the tibia once the leg was fully flexed in order to “loosen the knee joint” before commencing the test. The description given mirrored McMurray’s 1934 version except Hoppenfeld replaced the original abduction term with valgus stress. No inclusion of the lateral meniscus was presented.

In the early 80s, Dr. Robert Salter published his version of the McMurray’s test in his text Textbook of Disorders and Injuries of the Musculoskeletal System [13]. Like Gillis, he applied an abduction/adduction force to the knee and extended the tibia until tissue provocation. Salter also made clear that the greater the extension of the knee at the time of the click, the farther forward is the tear in the anterior horn. His account was poorly described, and he also failed to cite McMurray. In 1984, Dr. John Insall outlined the McMurray’s test in his text Surgery of the Knee [14]. Insall cited the McMurray’s 1942 rendition and acknowledged the presence of existing modifications but noted he was unclear of their origins. And while he essentially performed the test as cited, he did alter it with the application of an abduction/adduction force to the knee.

Over the past 30 years, a surge of textbooks emerged written by prominent clinicians whose accounts of the McMurray’s test were varied and seldom referenced McMurray directly. Some authors aligned themselves with Hoppenfeld and therefore limited the test’s scope to the medial meniscus with the valgus force bias, while others additionally incorporated the varus force to target the lateral [15-19]. All neglected to accurately identify these renditions as modifications with some citing Hoppenfeld as their primary source. One study even suggested the addition of axial compression through the tibia when moving from full flexion to extension might further assist in identifying the presence of a torn meniscus [20]. Several texts written within the last 10 years describe the test from full knee flexion to extension combined with tibial rotation as written by McMurray in 1948, but often provide his semilunar cartilage reference from 1942 or a primary source other than McMurray [21-23].

It is clear that over the past 90 years there have been many variations of the McMurray’s test. As evidence-based medicine evolves, we must proceed with caution and at times examine the consistency of even its most established standards of practice. It is our duty as authors, scholars, and researchers to write with greater accuracy when disseminating our scientific information. This commitment will ensure the best clarity for its readers.

References

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