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New nomenclature of McBurney's points according to of old and recent anatomical and clinical publications

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Systematic Review

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Abstract

Abstract

Background: McBurney's point is traditionally considered as the main clinical landmark for the diagnosis of acute appendicitis. However, several anatomical and radiological studies have shown that the surface projection of the appendiceal base is highly variable, calling into question the anatomical validity of this landmark. This controversy led our team to conduct new anatomical and clinical research on this important issue.

Objective: To raise awareness among anatomists and surgeons about the lack of consensus regarding the location of McBurney's points and to make our proposal for a more descriptive anatomical nomenclature for these points more widely known.

Methods:A narrative review of the literature was conducted using biomedical databases and scientific search engines. Historical, anatomical, radiological and clinical studies concerning McBurney's points, the umbilicospinal line and the anatomical projection of the appendiceal base were selected and analyzed.

Results: Radiological studies by Karim et al. and Naraynsingh et al. showed that, in the majority of cases, the appendiceal base does not project onto the classically described McBurney's point. Duque proposed incorporating the umbilicospinal line into anatomical nomenclature. Our anatomical and clinical studies confirmed the value of this line as an anatomical and clinical landmark, with the projection of the appendiceal base and the location of elicited pain in uncomplicated appendicitis most often occurring along this line.

Conclusion: Available data indicate that the umbilicospinal line is a more relevant anatomical and clinical landmark than McBurney's point for describing the ileocecal-appendiceal region. We propose its incorporation into the Terminologia Anatomica under the term linea ombilicospinalis, together with the adoption of the terms punctum ombilicospinalis medium and punctum ombilicospinalis lateralis to improve anatomical precision and international terminological harmonization.

Keywords: Vermiform appendix, McBurney, linea ombilicospinalis, punctum ombilicospinalis medium, punctum ombilicospinalis lateralis

INTRODUCTION

1. Background

McBurney's point (MP) is classically defined as the surface projection of the base of the vermiform appendix onto the anterior abdominal wall. Its clinical importance dates back to the pioneering work of Charles McBurney, who in 1891 described a point of maximal tenderness observed in patients with acute appendicitis [1]. Since then, this anatomical landmark has become a major component of abdominal

clinical examination and a historical symbol of the diagnosis of appendicitis. A few years later, McBurney also described the right iliac gridirion incision that bears his name, thereby contributing to the development of modern appendiceal surgery [1,2].

Acute appendicitis remains one of the most frequent abdominal surgical emergencies worldwide. It is estimated that approximately 7% of the population will develop this condition during their lifetime, making appendectomy one of the most frequently performed surgical procedures worldwide. Despite considerable advances in medical imaging and minimally invasive surgery, clinical examination remains essential for diagnostic orientation, particularly in resource-limited settings where access to complementary investigations remains restricted. In his original description, McBurney located the point of maximal tenderness on the line joining the umbilicus and the right anterior superior iliac spine (RASIS), at a distance of one inch and a half and or two inches from this spine [1].

However, over time, the anatomical interpretation of this landmark has evolved heterogeneously. English-speaking authors generally locate McBurney's point at the junction of the lateral and middle thirds of the right umbilico-spinal line [3-5], whereas several leading French-speaking anatomists, notably Léger [6], Rouvière and Testut [7,8], as well as Kamina [9], place it in the middle of the same line. This discrepancy reflects the lack of consensus regarding the exact location of McBurney's point and raises questions about its actual anatomical relevance.

Over recent decades, several anatomical and radiological studies have challenged the correspondence between McBurney's point and the projection of the appendiceal base. The studies by Karim et al. [11] and Naraynsingh et al. [12] in particular showed that the appendiceal base rarely projects onto this point, highlighting the considerable anatomical variability of the ileocecal-appendiceal region. These observations have revived the debate about the anatomical and clinical value of McBurney's point and the need to adopt a more descriptive terminology consistent with the modern principles of the Terminologia Anatomica.

In this context, we conducted a narrative review of the literature incorporating the main historical, anatomical, radiological and clinical studies devoted to McBurney's points. This synthesis is complemented by our own recent studies conducted in the Democratic Republic of the Congo. The objective is to critically reassess the anatomical and clinical foundations of McBurney's points, clarify the discrepancies existing in the literature, and propose a more coherent anatomical nomenclature based on the umbilicospinal line.

Methods

2. Methods

2.1 Study design

The present study synthesizes the main previous publications that served as the basis for our work [1–4], and then summarizes our already published results [14,15]. It also proposes a reflection on a more descriptive nomenclature consistent with the Terminologia Anatomica for designating the two McBurney's points described in the literature.

2.2 Study type

This is a narrative review of the literature aimed at analyzing current knowledge concerning McBurney's points, the umbilico-spinal line, and their anatomical and clinical relevance in the diagnosis of acute appendicitis. Although narrative in nature, the process of selecting and synthesizing articles was guided by the PRISMA 2020 recommendations for the identification, screening and analysis of relevant publications.

2.3 Documentary sources and search strategy

A systematic literature search was conducted between January and May 2026 in PubMed, Scopus, Web of Science and Google Scholar. The following keywords were used alone or in combination with the Boolean operators And OR: “McBurney point”, “McBurney’s point”, “umbilico-spinal line”, “vermiform appendix”, “appendicitis”, “appendix”, “anatomical landmark”, “surface anatomy”, “ceco-appendicular region”, as well as their French equivalents.

2.4 Inclusion and exclusion criteria

Original articles, anatomical, radiological and clinical studies, as well as studies addressing anatomical nomenclature, published in French or English and specifically dealing with McBurney's points, the umbilico-spinal line or the anatomical projection of the appendiceal base, were included. Articles that did not directly address these anatomical landmarks, conference abstracts without available full text, editorials, and redundant publications were excluded.

2.5 Study selection

The titles and abstracts identified during the search were independently assessed by the authors to determine their relevance. Potentially eligible articles were then subjected to full-text analysis. After removal of duplicates and application of the inclusion and exclusion criteria, 14 publications were retained for the final synthesis.

These studies included the historical studies of McBurney, the radiological analyses by Karim and Naraynsingh, as well as Duque's proposal to incorporate the umbilico-spinal line into the official list of anatomical nomenclature.

They also included the anatomical study by Wakeley (1933), data from Gray’s Anatomy (Standring, 2021), Clinically Oriented Anatomy (Moore et al., 2023), and Bailey & Love’s Short Practice of Surgery (Williams

et al., 2022), as well as our own anatomical and clinical studies conducted in the Democratic Republic of the Congo.

2.6 Data extraction and synthesis

For each included study, the following data were extracted: year of publication, study type, population or sample size, methodology, location of the appendiceal base, diagnostic value of the anatomical landmarks studied, and main conclusions. A narrative synthesis was performed to compare the results and assess the anatomical and clinical relevance of McBurney's points and the umbilico-spinal line. Data from anatomical, radiological and clinical studies were triangulated with the aim of proposing a more descriptive anatomical nomenclature consistent with the relevant recommendations of the Terminologia Anatomica.

Results

3.1 Previous publications

Original article by Charles McBurney

McBurney stated that the point of maximal tenderness was identified by pressure with a single finger on a point of the line joining the RASIS and the umbilicus, at a distance of 1.5 to 2 inches from the RASIS, based on 24 observations.

The study by Wakeley CPG (1933), involving an analysis of 10,000 cases, constitutes a large observational anatomical study based on dissection and surgical data. Its objective was to assess the position of the vermiform appendix. The results showed a predominantly retrocecal and pelvic location, with substantial variability in appendiceal position. This study also demonstrated variability in the cutaneous projection of McBurney's point according to the different positions of the appendix, concluding that the appendix displays considerable anatomical diversity, challenging the reliability of a single cutaneous point for clinical localization [10].

Omar Karim (1990) – Karim et al. examined 51 barium enemas after evacuation to locate the appendiceal base in relation to an opaque landmark placed at McBurney's point (junction of the lateral and middle thirds of the right umbilico-spinal line). The base projected onto this point in only one patient. The other locations were iliac (15%), umbilical (15%), inguinal (11%) and pelvic (59%). The authors concluded that the surface projection of the base was generally lower and questioned whether McBurney's point was a myth or a reality [11].

Naraynsingh (2002) – Naraynsingh et al. conducted a similar study on 100 double-contrast barium enemas. Only one patient showed projection at McBurney's point. In 62% of cases, the base was more cranial (up to 10 cm), and in 32% it was more caudal. These authors recommended warning surgeons in training about the limitations of McBurney's point and even questioned whether it should be abandoned [12].

Eduardo Duque (2013) – Duque noted that the umbilico-spinal line is not included in the official nomenclature. He recalled the abandonment of eponyms (1933) and the recommendations of Rio de Janeiro (1989). He proposed including this line in the nomenclature and renaming McBurney's point “supraspinal point” [13].

In Gray’s Anatomy (Standring S, 2021), a reference work in anatomy, data from the anatomical, radiological and surgical literature are synthesized. The ileocecal region is described as the usual location of the appendiceal base, most often in a posteromedial position relative to the cecum, with frequent variations in the orientation of the appendix. McBurney's point is presented as a classic but non-constant clinical landmark. The work therefore emphasizes the anatomical variability of the appendix and recommends cautious interpretation of surface landmarks in clinical practice [3].

According to **Moore KL et al. (2023)** in Clinically Oriented Anatomy, the appendix arises at the convergence of the three taeniae of the cecum and is generally located in the right iliac fossa, with variability in position. This anatomoclinical synthesis, based on imaging, surgery and dissections, indicates that McBurney's point is a useful but approximate landmark in the clinical diagnosis of appendicitis. The authors emphasize the need for anatomoclinical correlation rather than reliance on a single fixed landmark [4].

Williams et al. (2022), in Bailey & Love’s Short Practice of Surgery, report that the position of the appendiceal base is variable, most often retrocecal or pelvic. McBurney's point is described as a useful but nonspecific clinical landmark. The authors conclude that the diagnosis of appendicitis relies on a multimodal approach combining clinical, laboratory and radiological data, with the anatomical landmark having essentially indicative value [5].

3.2. Our research

Anatomical study

Objective: to analyze variations of the vermiform appendix and propose improved nomenclature.

Methods: observational study of 160 laparotomies performed in three hospitals in Kinshasa.

Results: the cecum was mobile in 77.5% of cases and was generally found in the iliac position. The descending position of the vermiform appendix was the most frequent. The surface projection of the appendiceal base corresponded to the middle of the umbilico-spinal line in the majority of cases; the second most frequent location was the junction of the middle and lateral thirds on the same line. Some statistically significant differences were observed according to age and sex.

Conclusion: marked interindividual variability. Proposal: “middle umbilicospinal point” and “lateral umbilicospinal point” [14].

Clinical study

Objective: to analyze the location of pain in histologically confirmed non-perforated appendicitis.

Methods: analysis of 154 records of patients operated on for non-perforated appendicitis. We considered the middle McBurney's point (MMBP – midpoint of the right umbilico-spinal line), the lateral McBurney's point (LMBP – junction of the lateral and middle thirds), and Lanz's point.

Results: mean age 23.3 years, with female predominance (77.9%). Pain was felt in the right iliac fossa in 96.1% of cases. On palpation: MMBP was painful in 89.6%, LMBP in 83.1%, and Lanz's point in 69.5%.

Conclusion: pain is not limited to a single point, but these landmarks retain educational value [15].

3.3. Proposal for a new nomenclature

FICAT (International Federation of Associations of Anatomists) and anatomists have the responsibility to ensure the clarity, precision and descriptive value of anatomical terms. To replace confusing eponyms, we propose, as Duque [12] did, including the umbilicospinal line (linea ombilicospinalis) in the official nomenclature. Two points of diagnostic and therapeutic interest will be defined on it:

- Punctum ombilicospinalis medium (midpoint of the line)
- Punctum ombilicospinalis lateralis (junction of the lateral and middle thirds)

In place of McBurney's points.

Discussion

The present review highlights the lack of consensus regarding the anatomical location of McBurney's point and emphasizes the limitations of using it as a constant projection of the appendiceal base. Radiological studies by Karim et al. [11] and Naraynsingh et al. [12] showed that the appendiceal base rarely projects onto McBurney's point as classically described. Although these authors reported different trends regarding the direction of anatomical variations—Karim et al. observing a predominance of higher locations, whereas Naraynsingh et al. reported more caudal locations—their findings converge on the same conclusion: the ileocecal and appendiceal region exhibits substantial anatomical variability, limiting the value of McBurney's point as a universal anatomical landmark.

These observations are consistent with Wakeley's anatomical work [9], which had already demonstrated the great diversity of vermiform appendix positions in a series of 10,000 dissections. More recently, medical imaging studies have confirmed that the position of the appendiceal base and the orientation of the appendiceal body vary considerably between individuals, due to differences in embryological development of the cecum and variations in intestinal rotation [8,9]. These data explain why the surface projection of the appendiceal base cannot be reduced to a single constant point.

Furthermore, advances in medical imaging and laparoscopic surgery have profoundly changed the diagnostic and therapeutic management of acute appendicitis. Nevertheless, despite these advances,

surface anatomical landmarks remain of considerable importance, particularly in clinical anatomy teaching, physical examination, and resource-limited settings where access to imaging remains restricted. From this perspective, the question is not only whether McBurney's point corresponds to the projection of the appendiceal base, but also whether an anatomical terminology can adequately reflect the variations observed.

Duque's proposal [13] to incorporate the umbilicospinal line into anatomical nomenclature therefore constitutes a major contribution. In accordance with the principles of the Terminologia Anatomica, which favors descriptive terms over eponyms, adoption of the term linea ombilicospinalis appears particularly relevant. We also share the view that anatomical names should reflect observed morphological realities rather than perpetuate historical interpretations that are sometimes ambiguous. In this regard, we propose replacing the designation “supraspinal point” with punctum ombilicospinalis lateralis and introducing the term punctum ombilicospinalis medium to designate the landmark traditionally used in the French-language anatomical and clinical literature.

Our recent anatomical and clinical studies [14,15] provide additional evidence to this debate by simultaneously evaluating the anatomical and clinical significance of the two locations traditionally attributed to McBurney's point. Unlike studies based exclusively on imaging, these investigations were conducted under operative conditions allowing direct identification of the appendiceal base. They show that the umbilicospinal line is a relevant anatomical and clinical landmark, both for the projection of the appendiceal base and for the localization of elicited pain in uncomplicated appendicitis. These results strengthen the rationale for a nomenclature based on the umbilicospinal line rather than on an eponym whose definition remains variable among anatomical schools.

This review nevertheless has some limitations. The number of studies specifically devoted to McBurney's point remains small and the methodologies used are heterogeneous, limiting direct comparisons between results. Multicenter studies based on computed tomography imaging, intraoperative anatomical analysis and populations from diverse backgrounds would be useful to confirm the current observations and further clarify the most representative surface landmarks of the ileocecal-appendiceal region.

This review has several strengths, notably the integration of historical, radiological, anatomical and clinical data concerning McBurney's points. It is also the first French-language synthesis proposing an alternative anatomical nomenclature based on contemporary data. Nevertheless, it has some limitations, particularly the small number of available studies and the absence of data from multicenter computed tomography studies.

Limitations Of the Stadie

This study has several limitations. The relatively small number of publications specifically addressing McBurney’s point and the umbilicospinal line, together with the heterogeneity of the study designs and anatomical assessment methods, limited direct comparisons across studies. In addition, the narrative

nature of the review may have introduced selection bias, despite the use of a structured literature search and study selection process informed by PRISMA 2020 recommendations. The anatomical and clinical evidence supporting the proposed nomenclature also includes studies conducted in Kinshasa, Democratic Republic of the Congo, which may limit the generalizability of the findings to other populations and healthcare settings. Furthermore, the lack of multicenter studies using standardized imaging protocols and intraoperative anatomical assessments limits the external validation of the proposed anatomical landmarks. Further multicenter studies involving diverse populations and standardized assessment methods are therefore needed to confirm these findings and establish the broader clinical applicability of the proposed nomenclature.

Conclusion

This literature review shows that McBurney's point does not consistently correspond to the surface projection of the appendiceal base and that its location remains controversial. Available anatomical, radiological and clinical data highlight the considerable topographical variability of the ileocecal-appendiceal region, thereby limiting the value of this eponymous landmark as a universal anatomical reference. In contrast, the right umbilicospinal line appears to be a more relevant anatomical and clinical landmark for describing the projection of the appendiceal base, locating elicited pain in uncomplicated appendicitis, and guiding identification of the right iliac incision. These observations support the incorporation of the terms linea ombilicospinalis, punctum ombilicospinalis medium and punctum ombilicospinalis lateralis into the Terminologia Anatomica, in order to improve anatomical precision, reduce ambiguities associated with eponyms, and promote international harmonization of anatomical and surgical teaching and practice. Further multicenter studies are nevertheless required to confirm these observations in different populations.

Abbreviations

DRC: Democratic Republic of the Congo

MP: McBurney’s point

RASIS: Right anterior superior iliac spine

FICAT: International Federation of Associations of Anatomists

MMBP: Midpoint of the right umbilicospinal line

LMBP: Junction between the lateral and middle thirds of the right umbilicospinal line

Declarations

Conflicts of Interest

The authors declare that they have no conflicts of interest related to this study.

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Authors' Contributions

Thomas K. Kabanga conceived and designed the study, developed the study protocol, and drafted the first version of the manuscript. Tarcisse K. Kilara contributed to drafting the initial manuscript. Blaise M. Kapinga, Deogratias B. Kazadi, Alice T. Kabanga, Hervé K. Kabanga, Marie-Thérèse M. Kanyana, Charles Welo, John Z. Ntezolo, Arsène M. Kabanga, and Emmanuel S. Tambwe critically reviewed the manuscript for important intellectual content. Jean-Marie M. Kabongo provided scientific supervision. All authors reviewed and approved the final version of the manuscript and agree to be accountable for their respective contributions to the work.

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