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Anatomy in the Clinical Years: A Document-based Comparative Mapping of National and International Curricula

Klinik Yıllarda Anatomi: Ulusal ve Uluslararası Müfredatların Belge Temelli Karşılaştırmalı Haritalanması

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ABSTRACT

Aim: This study aimed to systematically map and compare the existence, content, and pedagogical characteristics of clinical-year anatomy education in Türkiye and internationally, and to interpret the findings within the frameworks of vertical integration, cognitive integration, and experiential learning.

Materials and Methods: A document-based descriptive and comparative design was used. Official curricula, course catalogs, and publicly accessible syllabi of 54 medical schools (30 national, 24 international) were analyzed according to the curricular analysis and reporting in document analysis framework. Data were extracted on course title, phase (pre-clinical vs. clinical), instructional materials, and thematic content. Frequencies and thematic patterns were reported through inductive coding.

Results: Anatomy was universally present in pre-clinical years (100%), whereas clinical-year anatomy was identified in only 25% (6/24) of international schools and in none of the Turkish schools. Among 12 identified courses, 91.7% were in year 4, focusing mainly on regional/clinical (75%) and gross anatomy (66.7%). Cadaver dissection remained the dominant instructional material (58.3%), while radiological and microanatomy content was scarce.

Conclusion: Anatomy education shows strong early-phase intensity but a late-phase gap. The absence of structured anatomy sessions in the clinical years of Turkish curricula and the limited global implementation of vertical integration indicate a critical pedagogical deficiency. Re-establishing longitudinal anatomy threads through cadaver-based, radiology-integrated, and small-group approaches is essential to strengthen clinical reasoning, procedural safety, and professional readiness.

Keywords: Anatomy education, clinical years, vertical integration, learning

ÖZ

Amaç: Bu çalışma, Türkiye'de ve uluslararası düzeyde klinik yıl anatomi eğitiminin varlığını, içeriğini ve pedagojik özelliklerini sistematik olarak haritalandırmak ve bulguları dikey entegrasyon, bilişsel entegrasyon ve deneyimsel öğrenme çerçevelerinde yorumlamak amacıyla yapılmıştır.

Gereç ve Yöntem: Bu araştırmada belge temelli tanımlayıcı ve karşılaştırmalı bir tasarım kullanılmıştır. Elli dört tıp fakültesinin (30 ulusal, 24 uluslararası) resmi öğretim planları, ders katalogları ve çevrim içi erişilebilir müfredat dokümanları belge analizinde müfredat incelemesi ve raporlanması çerçevesine göre analiz edilmiştir. Ders adı, dönem (preklinik/klinik), öğretim materyalleri ve tematik içerik verileri çıkarılmış; frekanslar ve tematik örüntüler indüktif kodlama yoluyla raporlanmıştır.

Bulgular: Anatomi eğitimi preklinik yıllarda tüm kurumlarda (%100) yer alırken, klinik yıl anatomisi yalnızca uluslararası kurumların %25'inde (6/24) saptanmış; Türk kurumlarında ise hiçbirinde tanımlanmamıştır. Belirlenen 12 dersin %91,7'si 4. sınıfta yer almakta olup, içerikler ağırlıklı olarak bölgesel/klinik anatomi (%75) ve makro anatomi (%66,7) temalarına odaklanmaktadır. Kadavra diseksiyonu en yaygın öğretim materyalidir (%58,3); radyolojik ve mikroanatomi içerikleri oldukça sınırlıdır.

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Sonuç: Anatomi eğitimi erken dönemde yoğun, ileri klinik dönemde ise belirgin bir boşluk göstermektedir. Türkiye'de klinik yıllarda yapılandırılmış anatomi oturumlarının bulunmaması ve uluslararası düzeyde dikey entegrasyonun sınırlı biçimde uygulanması önemli bir pedagojik eksikliğe işaret etmektedir. Anatomi eğitiminin kadavra temelli, radyolojiyle entegre ve küçük grup odaklı yaklaşımlarla klinik yıllara uzanan süreğen bir müfredat bileşeni hâline getirilmesi, klinik akıl yürütme, girişimsel güvenlik ve mesleki hazırlığı güçlendirmek açısından gereklidir.

Anahtar Kelimeler: Anatomi eğitimi, klinik yıllar, dikey entegrasyon, öğrenme

INTRODUCTION

Anatomy provides the cognitive framework for clinical reasoning, procedural safety, and professional identity formation; however, over the past forty years, teaching hours, opportunities for cadaver dissection, and the number of teaching staff have declined in many countries, raising concerns that this situation has fallen below the threshold for patient safety[1,2]. The disruption of access to laboratories during the coronavirus disease 2019 pandemic, coupled with the rapid proliferation of remote and hybrid approaches, has made this vulnerability more apparent; dissection and face-to-face laboratory-based learning have quickly given way to online and visually-focused solutions[3,4]. The disruption of laboratory access during the pandemic limited opportunities for applied anatomy, particularly during clinical years, and this situation created a permanent learning gap that could not be fully recovered after the pandemic. However, national and regional surveys show that the time allocated to teaching anatomy in modern medical curricula, as well as the methods used, vary significantly across countries and institutions[5,6]. In contemporary medical education, the principle of vertical integration aims to integrate basic sciences with clinical sciences throughout the curriculum, embed fundamental content in a clinical context from an early stage, and maintain this relationship throughout the clinical years[7]. This approach requires design decisions at the session level, enabling the learner to establish cognitive integration between basic and clinical concepts in their minds, not just to organize the timeline[8]. The spiral curriculum concept supports this vertical continuity by suggesting that the same themes be revisited at increasing levels of complexity and that prior learning be reinforced through application and decision-making in clinical years[9]. Experiential learning, on the other hand, operates through the "experience–reflection–conceptualization-application" cycle using real or realistic tasks in a clinical context; anatomy laboratories and clinical anatomy sessions are among the most direct tools for this cycle[10].

In recent years, integrating clinical anatomy directly into clinical year rotations has yielded findings suggesting that it can enhance students' ability to recall information, build confidence, and improve contextual reasoning skills. Workshops and near-peer teaching models conducted during surgical rotations have facilitated upper-level students' transfer of anatomical knowledge acquired during the preclinical period to clinical scenarios; meaningful improvements in self-efficacy, orientation in the operating room, and confidence in structure identification have been reported[11-13]. The acceptability and perceived effectiveness of year-specific, focused anatomy workshops and vertical integration-based courses are high; it is recommended that this model be widely adopted to accompany internships[14,15]. This trend is consistent with findings that cadaver-based simulations enhance knowledge, skills, and confidence in the post-graduation stage and points to continuity between pre- and post-graduation[16].

In the Turkish context, the National Standards for Pre-Graduation Medical Education and the National Core Education Program explicitly define horizontal and vertical integration as a normative expectation; many faculties' self-assessment reports state that integration with basic sciences continues during the clinical period[17,18]. However, there is no systematic, comparative, and document-based mapping study at the national level regarding how anatomy content (scope, duration, pedagogical methods, assessment approach) is positioned among institutions during the clinical years. Internationally, there is also a heterogeneous picture, with strong anatomy teaching in the pre-clinical period that becomes increasingly sparse in the clinical period[5,6]. This gap is critical both for providing an evidence-based perspective on the local implementation of the principle of vertical integration and for developing policy and program recommendations for clinical anatomy designs that are consistent with the principles of cognitive integration and spiral curriculum[8,9].

The lack of a systematic national comparison of the position of the clinical year anatomy in the curriculum creates a significant decision-making gap for both policymakers and curriculum developers. This gap makes it difficult to compare how institutions plan clinical-year integration and prevents the development of an evidence-based perspective on where students' clinical competencies need support. Therefore, objectively documenting national trends in clinical year anatomy is critical to assessing the sustainability of vertical integration. This study aims to systematically compare the existence, content, teaching methods, and assessment approaches of clinical-year anatomy by examining the official curricula and publicly available documents of medical schools in Türkiye and international examples; to interpret the findings within the frameworks of vertical integration, cognitive integration, and experiential learning; and to discuss the alignment of the evidence obtained with national standards and global trends.

In this way, we aim to provide evidence-based, applicable, and contextual recommendations for the sustainable enhancement of anatomy education in clinical years[7,8,10].

MATERIALS AND METHODS

Study Design

This study is designed as a descriptive and comparative, document-based study to compare the anatomy education curricula of top-ranked medical schools in Türkiye and internationally. The systematic review of curriculum documents was chosen because it is conducive to revealing institutional curriculum structures and evidence of vertical integration within the context[19]. Further, the curricular analysis and reporting in document analysis (CARDA) framework has been adopted as a methodological framework that provides documentation review-specific reporting standards in healthcare professional education[20]. Elements of the CARDA framework were applied at multiple stages of the analysis. Curriculum structure and resource specification guided the identification and mapping of course characteristics, whereas content mapping and evidence integration informed the inductive thematic coding. The reporting transparency component of CARDA was used to structure the presentation of results and ensure traceability.

Setting and Sample

The international sample was created based on institutions listed in the QS World University Rankings by Subject 2024: Medicine[21]. The national sample was selected from the universe of "universities with medical faculties" in the URAP 2024-2025 Türkiye Ranking[22]. The inclusion criterion was that the curriculum/course catalog information on the official website of the relevant institutions be publicly accessible. In contrast, the exclusion criterion was the absence of a medical faculty or open access to the curriculum. During the selection process, two institutions without a medical faculty and four institutions without open access to the curriculum were excluded; 24 international and 30 national medical faculties were included in the final sample.

Data Collection and Coding

The curriculum pages, course catalogs, syllabi, and/or academic handbooks sections of each institution were systematically scanned. The search was conducted independently by three anatomists, all experts in the field, and any potential discrepancies were resolved through a consensus meeting. Any discrepancies between coders were discussed and resolved through consensus meetings among the three anatomists; inter-rater agreement was not formally quantified. During the scan, the keywords "anatomy," "dissection," and "foundation" were used in page-internal and site-internal searches; for each course, the variables class year (preclinical vs. clinical), course title, educational materials (e.g. cadaver dissection, laboratory materials, microscope, digital/visual resources, video content, specialty equipment), and integration approach were recorded on a standardized data extraction sheet. These keywords were selected to maintain consistency across institutions and because they are the most frequently used terms to denote anatomy-related content in course catalogs. Although broader terms might reveal additional activities, we prioritized a standardized and reproducible search strategy.

In this study, the distinction between the preclinical and clinical periods was made based on both the institutions' own curriculum classifications and the educational stages defined in the literature. In foreign universities, the definitions of "preclinical" and "clinical" specified in the course catalogs were accepted directly in line with the institution's own classification. This approach is consistent with the literature, indicating that the boundary between basic sciences and clinical sciences varies structurally across different education systems[23-25]. However, in Turkish medical schools, the distinction between pre-clinical and clinical is generally structured to coincide with the start of clinical internships. Therefore, in Turkish institutions, the distinction is based on the start of the clinical clerkship period; in international institutions, the institution's official classification serves as the basis.

Statistical Analysis

Document analysis was conducted in accordance with the CARDA checklist, covering the dimensions of curriculum structure, content mapping, integration of evidence, resource specification, and reporting transparency[20]. Within the scope of quantitative description, frequencies (n) and percentages (%) were reported. Inductive thematic analysis was applied to the content of the courses included in the clinical years[26]. During thematic coding, content themes (e.g. gross anatomy, radiological anatomy, regional anatomy, clinical anatomy, microanatomy, embryology) and materials/integration themes were considered together; a lesson may contain more than one material/theme. Since the study was conducted on publicly available documents, it does not involve human/animal subjects and does not require ethics committee approval.

RESULTS

Institutional Coverage and Selection Flow

The study included 24 international medical schools from the QS-Medicine 2024 ranking that met the selection criteria, and 30 national medical schools from the URAP 2024 ranking. In the international group, two institutions without a medical school and four institutions without open access to the curriculum were excluded. A total of 54 medical schools were analyzed.

The reasons for exclusion and the number of institutions are summarized in Table 1.

Distribution of Anatomy Education Across Phases

Anatomy education is available in both groups during the pre-clinical period (years 1-2). At least one introductory anatomy course is offered in 24/24 (100%) institutions in the international group and 30/30 (100%) institutions in the national group. This indicates that anatomy education is a mandatory curriculum component in both systems during the pre-clinical period (Table 2). In the clinical period (years 3-6), anatomy education was identified in 6 international institutions (25%); a total of 12 courses were included in the analysis. 1 course is at year 3 (8.3%), 11 courses are at year 4 (91.7%); there is no independent anatomy education at the year 5-6 levels. In the national group, no clinical anatomy course defined as independent or modular was identified in the clinical period. Taken together, these findings indicate that while anatomy is universally present in the pre-clinical years in both settings, only the international sample retains explicitly defined anatomy courses in the clinical phase.

Characteristics of Clinical-year Anatomy Courses

A total of 12 clinical-year anatomy courses have been identified. Most are offered in year 4. Institutions offering clinical-year anatomy education include: University of California, San Francisco (UCSF), University of British Columbia (UBC), Imperial College London, and University of Michigan. At UCL, the Advanced Anatomy course is conducted with cadaver and dissection plans, while at UCSF, three modules based on regional dissection (Head & Neck, Musculoskeletal, Thorax-Abdomen-Pelvis) have been defined. UBC offers courses in Human Anatomy, Microscopic Anatomy, Neuroanatomy, and Directed Studies in Anatomy. At the University of Michigan, Anatomy in Surgery and Head and Neck Teaching Elective courses are defined as pre-clinical preparation modules, while the Residency Preparatory Course is defined as a pre-specialty anatomy review. Imperial College London has defined a clinical anatomy module, but detailed information is not available.

The most frequently used teaching material in clinical year courses was cadaver dissection (7/12; 58.3%). Laboratory materials (3D models etc.) ranked second (3/12; 25%). Microscope, video content, and specialty equipment were each used in one course (1/12; 8.3%). Material information was not included in four courses. In cases where more than one material was used, cadavers and radiological sources were used together (Figure 1).

A summary of course types, instructional materials, content themes, and year levels across the identified clinical-year anatomy courses is presented in Table 3.

Thematic analysis identified six main content themes for the 12 courses in the clinical period: regional/clinical anatomy (n=9; 75%), gross anatomy (n=8; 66.7%), microanatomy (n=2; 16.7%), embryology (n=1; 8.3%), radiological anatomy (n=1; 8.3%), and unspecified (n=1; 8.3%). The distribution and proportional visualization of the themes are presented in Figure 2. In contrast, no comparable, explicitly structured clinical-year anatomy modules were identified in the national sample, highlighting a divergence in how anatomy is represented during the clinical phase across the two contexts.

As these observations are based on a limited number of clinical-year courses (n=12), the findings should be interpreted with appropriate caution.

DISCUSSION

This study shows that anatomy is universal in the pre-clinical period; however, when moving to the clinical-year phase, anatomy remains a module/elective in only 25% (6/24) of the

Table 1. Selection and inclusion of medical schools (QS 2024-URAP 2024)

Group	Initial number of institutions	Exclusion criteria	Final included (n)
International (QS 2024)	30	2 without medical schools; 4 lacking open-access curricula	**24**
National (URAP 2024)	30	—	**30**
Total	**60**	**6 excluded**	**54 included**

PRISMA-style summary of included and excluded institutions. Six schools were excluded (two without medical programs, four lacking open-access curricula)

Table 2. Distribution of anatomy education across pre-clinical and clinical phases

Group	Pre-clinical anatomy (years 1-2)	Clinical anatomy (years 3-6)	Number of clinical-year courses	Year-wise distribution
International	24/24 (100%)	6/24 (25%)	12	Year 3: 1 (8.3%) Year 4: 11 (91.7%) Year 5-6: 0
National	30/30 (100%)	0/30 (0%)	—	—

Presence of anatomy courses by training phase and academic year among international and national medical schools

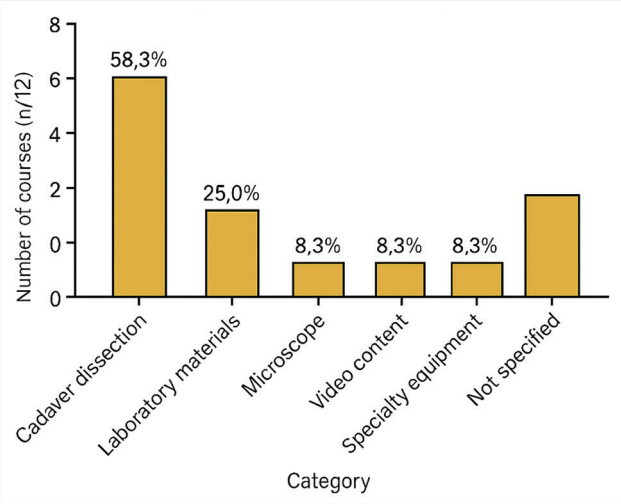

Figure 1. Distribution of instructional materials used in clinical-year anatomy courses (n=12)

Proportion (%) and frequency (n) of instructional materials reported across 12 clinical-year anatomy courses. Multiple materials may be used within a single course; therefore, totals exceed 12.

Cadaver dissection (7/12; 58.3%) was the most frequently used material, followed by laboratory materials (3/12; 25.0%). Microscope, video content, and specialty equipment were each reported in one course (8.3%), while four courses did not specify any materials

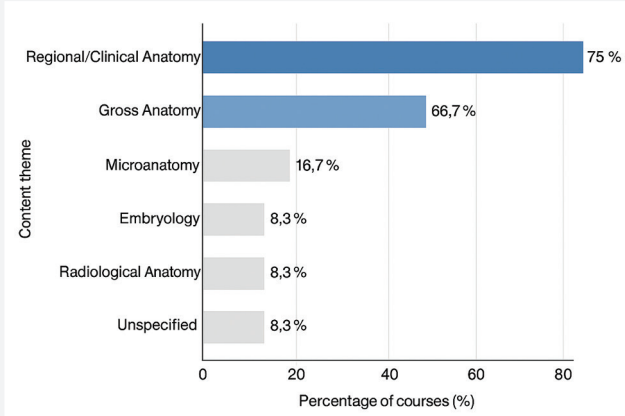

Figure 2. Thematic distribution of clinical-year anatomy courses (n=12)

Proportion (%) and frequency (n) of content themes identified through thematic analysis. regional/clinical and gross anatomy themes were the most frequent, followed by microanatomy, embryology, and radiological anatomy

During the preparation of this article, the authors used OpenAI's ChatGPT-5 tool to create figures. The figures were prepared with artificial intelligence support to enhance visual presentation and clarity; they were manually reviewed, edited, and approved by the authors for scientific accuracy and consistency with the study data. The authors assume full responsibility for all visual materials included in the article

Table 3. Summary of course types, instructional materials, content themes, and year levels identified across 12 clinical-year anatomy courses

Variable	Categories	Frequency (n=12)	Percentage
Course type	Elective	7	58.3%
	Module (regional dissection-based)	3	25.0%
	Preparation module (review/pre-surgical)	2	16.7%
Teaching materials	Cadaver dissection	7	58.3%
	Laboratory materials/3D models	3	25.0%
	Microscope	1	8.3%
	Digital/video-assisted materials	1	8.3%
Content themes	Regional/clinical anatomy	9	75.0%
	Gross anatomy	8	66.7%
	Microanatomy	2	16.7%
	Embryology	1	8.3%
	Radiologic anatomy	1	8.3%
Year level	Year 3	1	8.3%
	Year 4	11	91.7%

This table provides a descriptive overview of the instructional characteristics identified across all 12 clinical-year anatomy courses in the international sample. "Elective" refers to student-selected, non-mandatory anatomy courses offered during clinical training. "Module (regional dissection-based)" denotes structured, region-specific anatomy sessions conducted through cadaveric dissection, typically organized as part of a series (e.g., head and neck, musculoskeletal, thorax/abdomen/pelvis). "Preparation module" includes pre-surgical or residency preparation courses designed to reinforce anatomical knowledge prior to clinical specialization. Instructional materials were coded based on primary modalities explicitly stated in curriculum documents. Content themes reflect dominant anatomical domains emphasized within each course. Year level indicates the academic stage at which courses are offered, with the majority occurring in year 4 and a small number in year 3.

international sample, and in Türkiye, none of the institutions examined had a clearly defined clinical-year anatomy. Of the 12 courses offered, 91.7% were concentrated in year 4; no courses were reported in years 5/6. Content centers on regional/clinical anatomy and gross anatomy, while radiological anatomy and embryology are extremely rare; at the methodological level, cadaver dissection remains the dominant modality. This picture indicates that, despite claims of vertical integration, anatomy has failed to become a systematic longitudinal thread in the clinical phase. Over the past 20-30 years, global reports have shown a decrease in anatomy hours and a decline in the intensity of dissection/laboratory work, while integration has been designed more in the early stages. Our findings confirm this long-term trend as a gap that becomes apparent in the clinical phase[27].

In our study, clinical-year anatomy content was identified in only 25% of international institutions; the majority of these offered it as an elective in year 4. In Türkiye, however, no independent anatomy course or laboratory-based review has been defined for the clinical phase. These findings are consistent with international observations that anatomy teaching is concentrated in the early years and extends only to a limited extent into the clinical phase. Indeed, in a national survey of 39 medical schools conducted by Smith et al.[6] in the United Kingdom-Ireland region, it was reported that gross anatomy education is primarily delivered in years 1-2, with only 37% of institutions extending it beyond two years. This data indicates that the time allocated to anatomy in the clinical phase is limited and that integration is confined to the pre-clinical stage. Therefore, when our document-based analysis is evaluated alongside Smith et al.[6] empirical findings, it reveals that anatomy education follows an "early intensity - late gap" pattern at the national-international level. This situation shows that, although the principle of vertical integration is theoretically accepted, it cannot be practically transferred to the clinical phase. This situation demonstrates that, despite theoretical acceptance of the principle of vertical integration, it has not been adequately translated into practice in the clinical setting. This "early intensity-late gap" pattern suggests that it may be beneficial to consciously support clinical-year curricula with longitudinal anatomy touchpoints; thus, fundamental anatomy knowledge can be reinforced during clinical practice periods, when students use anatomical reasoning most intensively. In practice, this approach could be implemented by incorporating short anatomy refresher sessions into clinical rotations, utilizing radiology-integrated sessions, or applying targeted anatomy reviews prior to surgery.

The regional variation observed across institutions may stem from several structural and contextual factors. Differences in faculty staffing, curriculum governance, resource availability, and institutional priorities shape how and when anatomy is integrated into clinical training. In some settings, the dominance of discipline-based curricula limits opportunities for longitudinal anatomy reinforcement, whereas schools with stronger infrastructure or surgical teaching traditions more readily maintain clinical anatomy exposure. Cultural expectations regarding the role of dissection and hands-on anatomy also contribute to cross-regional variation. These findings align with Barut et al.[28], who demonstrated that regional and institutional contexts substantially influence approaches to anatomy learning, underscoring the need for context-sensitive and longitudinally structured educational designs.

It has been emphasized that vertical integration is a design that requires establishing cognitive bridges at the session level, not just on the timeline[8]. In contrast, cognitive integration is achieved by establishing causal links between basic and clinical concepts in the learner's mind. In light of our findings, these bridges may not be sustainable at the institutional level due to the scarcity of defined anatomy threads in clinical years.

In the Turkish context, the absence of clearly defined clinical-year anatomy courses may also reflect structural differences in how internships are organized and how clinical teaching responsibilities are distributed across departments. Clinical rotations often prioritize service-based learning, which may limit opportunities for structured anatomy reinforcement unless intentionally embedded. Moreover, institutional variability in faculty capacity, access to laboratory resources, and the presence of dedicated clinical anatomy units contributes to inconsistent integration practices across medical schools. Recent evidence further indicates that well-designed and structured anatomy modules can significantly enhance learner engagement and perceived educational value[29]. These findings underscore the importance of context-sensitive and deliberately structured approaches to sustain anatomy learning during the clinical years.

During the pandemic, access to cadaver dissection sessions was temporarily suspended, and many institutions turned to digital and hybrid materials.

However, when laboratories reopened after the pandemic, it was reported that these digital alternatives became permanent, and dissection-based hours did not return to their previous levels[3,30,31]. Therefore, the lack of a laboratory-based anatomy comeback in the clinical phase may be consistent with this global restructuring trend. On the other hand, radiology-integrated small group sessions, which are evidence-based bridging modalities, have been shown to improve anatomy performance, and point-of-care ultrasound (POCUS) integration has been shown to enhance anatomy comprehension and short-term learning outcomes[32]. In our study, radiological anatomy was identified in only 1/12 sessions, and no systematic

evidence was found for POCUS integration, suggesting an evidence-practice gap. Our findings reveal that anatomy is not structured into the curricula of national and international medical schools, particularly during the clinical years. In contrast, a recent literature analysis shows that systematic clinical anatomy teaching practices can increase student success and interest[33].

The relegation of anatomy sessions to the background during clinical years may indicate not only a local curriculum preference but also a systemic deficiency in instructional design and resource allocation.

While Walker et al.[33] reports the positive effects of systematically presented clinical anatomy sessions, our findings show that such practices are absent or very limited in Türkiye and in the institutions included in the study.

This situation suggests that pedagogical frameworks such as vertical integration, cognitive integration, and experiential learning are not being effectively implemented.

This deficiency can be considered risky, especially in the context of clinical internships, interventional practices, and patient care preparation, as the literature emphasizes the relationship between anatomical knowledge and clinical decision-making and practice safety[34].

Therefore, it is critically important for medical education programs to reposition the "representation of anatomy in the clinic" in their core curricula in order to enhance the clinical preparedness capacity of the programs and reinforce the safe practice skills of graduates.

Study Limitations

The strongest aspect of this study is its use of a multi-centered and official document-based analysis design. Curriculum data were systematically examined using the CARDA framework, ensuring standardized, transparent, and traceable data extraction and reporting processes. Using the same methodological framework for both national and international examples enhanced the comparability of findings. However, the study has some limitations. First, hidden or informal curriculum elements were outside the scope of this research. Pre-internship briefings, brief in-service clinical reminders, or case-linked anatomy presentations are often not listed in official course catalogs. They may therefore not have been counted toward the clinical-year anatomy course. Second, the heterogeneity of course titles and classifications across institutions may have led to misclassification; clinically relevant anatomy sessions such as radiology-integrated or surgical anatomy workshops may not have been captured if they were not explicitly labeled under "anatomy," creating a potential risk of false negatives. In addition, elective anatomy courses are often listed inconsistently or embedded within broader modules on institutional websites, which may result in certain anatomy offerings remaining partially or completely invisible during document extraction. Third, as the study was based solely on publicly available documents, student or graduate outcomes (e.g. objective structured clinical examination performance, error rates, clinical safety indicators) could not be evaluated. Additionally, unavailable or incompletely reported documents represent another limitation. Since not all institutions share their curriculum data publicly and in an up-to-date manner, access to some sources may have been unavailable, or content may not have been presented with sufficient clarity. The lack of direct communication with institutions and the absence of verification constitute a structural limitation of this research, inherent to the nature of document analysis. Differences in how institutions define the boundary between pre-clinical and clinical phases may influence cross-country comparability; therefore, findings should be interpreted with this structural heterogeneity in mind. As this study relied solely on publicly available curriculum documents, some interpretations necessarily reflect document-based inferences rather than direct observation, and should therefore be understood within the limits of this methodological approach.

CONCLUSION

The findings of this study show that anatomy education in clinical years remains weak in terms of continuity and content at the international level, while structured anatomy sessions are almost non-existent in the clinical phase in Türkiye. When comparing examples from Türkiye and the rest of the world, it is clear that the principles of vertical integration and cognitive integration are not sufficiently implemented at the clinical year level. The placement of anatomy sessions primarily as electives in year 4 and their absence in years 5/6 falls short of providing the depth expected at times when anatomy is critical for clinical practice and procedural safety. In this context, it is recommended that medical school programs carry a longitudinal anatomy thread into the clinical years, incorporating both laboratory-based (e.g. cadaver/prosection) sessions and radiology-integrated, POCUS-assisted, and small group approaches. Such a restructuring could transform anatomy education from being merely an early-stage requirement into a strong foundation for clinical decision-making, safe procedures, and professional skills ready for post-graduation practice.

Ethics

Ethics Committee Approval: This study was conducted using publicly available institutional documents and did not involve human or animal participants; therefore, ethics committee approval was not required.

Informed Consent: The study was conducted using publicly available documents, it does not involve human or animal subjects.

Footnotes

Presentation: This study was presented as an oral communication at the 12th Anatomy Winter Days congress (abstract no: 9491796).

Authorship Contributions

Concept: F.T.K., Design: F.T.K., M.Y., Data Collection or Processing: F.T.K., B.K., F.O., M.Y., Analysis or Interpretation: F.T.K., B.K., F.O., M.Y., Literature Search: F.T.K., B.K., F.O., M.Y., Writing: F.T.K.

Conflict of Interest: No conflict of interest was declared by the authors.

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