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·正畸学专栏 综述·

正畸领域口腔健康相关生活质量研究的文献计量分析

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【摘要】　目的　基于文献计量学方法，分析正畸领域口腔健康相关生活质量（oral health-related quality of life，OHRQoL）研究的发表趋势、合作网络、关键词热点及主题演化，为后续研究设计和患者报告结局评价提供参考。**方法**　检索Web of Science Core Collection和PubMed数据库，检索截止日期为2025年12月，不限定起始发表年份。纳入英文原创研究和综述文献。采用题录去重、题名/摘要筛选和全文评估后，最终纳入891篇文献。利用CiteSpace对作者、国家、关键词、被引文献、关键词聚类及时间线进行可视化分析，主要指标包括发文量、中介中心性、被引频次、关键词频次、关键词中心性、模块度Q值及轮廓系数S值。**结果**　纳入891篇文献，其中原创研究793篇、综述98篇，实际发表年份覆盖1995—2025年。2013年前年度发文量总体较低，2013年后呈增长趋势，并于2022年达到峰值。Paiva Saul Martins发文量最高，共17篇。国家层面，巴西发文量最高，共161篇，占18.1%；美国中介中心性最高，为1.00。被引文献分析显示，Dimberg等2015年发表的研究被引频次最高，为36次。关键词共现分析显示，“Quality of life”出现频次最高，为287次；“Oral health”的中介中心性最高，为0.19。关键词聚类分析共识别出11个聚类，模块度Q值为0.397 8，平均轮廓系数S值为0.764 7，研究主题主要涉及治疗需求评估、不同正畸治疗方式与OHRQoL、OHRQoL评估工具、儿童青少年及特殊人群以及口腔与全身健康关联等方向。时间线分析提示，研究热点由错𬌗畸形和治疗需求逐渐扩展至患者报告结局、心理社会影响及量表验证。**结论**　正畸领域OHRQoL研究总体呈增长趋势，研究重点由单一治疗结局评价逐渐转向多维患者报告结局和心理社会因素评估。文献计量学结果可用于识别研究热点、合作网络和主题演化趋势，但不能直接推断具体正畸干预的临床疗效或决定因素。

【关键词】　口腔健康相关生活质量；　正畸；　文献计量学；　患者报告结局；　CiteSpace；　错𬌗畸形；　治疗需求；　心理社会影响；　合作网络；　主题演化
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Bibliometric analysis of oral health-related quality of life research in orthodontics

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【Abstract】 Objective To analyze publication trends, collaboration networks, keyword hotspots, and thematic evolution in orthodontic research on oral health-related quality of life (OHRQoL) using bibliometric methods, and to provide a reference for future research design and patient-reported outcome assessment. **Methods** The Web of Science Core Collection and PubMed databases were searched from inception to December, 2025. English-language original articles and reviews were included. After deduplication, title/abstract screening, and full-text assessment, a total of 891 publications were included in the final analysis. CiteSpace was used to analyze authors, countries, keywords, cited references, keyword clusters, and timeline views. The main indicators included publication counts, betweenness centrality, citation frequency of cited references, keyword frequency, keyword centrality, modularity Q, and silhouette S. **Results** A total of 891 publications were included, comprising 793 original articles and 98 reviews, with publication years spanning 1995-2025. Annual output remained relatively low before 2013, increased thereafter, and peaked in 2022. Paiva Saul Martins was the most productive author, with 17 publications. Brazil had the highest publication output, with 161 publications (18.1%), whereas the United States showed the highest betweenness centrality (1.00). Cited references analysis revealed that the 2015 study by Dimberg et al. was the most frequently cited reference, with 36 citations. "Quality of life" was the most frequent keyword (n = 287), whereas "oral health" showed the highest betweenness centrality (0.19). Keyword clustering identified 11 clusters, with a modularity Q of 0.397 8 and a mean silhouette S of 0.764 7. Major themes included treatment-need assessment, orthodontic treatment modalities and OHRQoL, OHRQoL assessment instruments, children/adolescents and special populations, and oral-systemic health associations. Timeline analysis suggested a thematic shift from malocclusion and treatment needs toward patient-reported outcomes, psychosocial impact, and scale validation. **Conclusion** Orthodontic OHRQoL research has shown an overall growth trend, with research attention gradually shifting from treatment outcome evaluation to multidimensional patient-reported outcomes and psychosocial assessment. Bibliometric findings help identify research hotspots, collaboration patterns, and thematic evolution, but they should not be interpreted as direct evidence of clinical effectiveness or causal determinants.

【Key words】 oral health-related quality of life; orthodontics; bibliometrics; patient-reported outcomes; CiteSpace; malocclusion; treatment need; psychosocial impact; collaboration networks; thematic evolution
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口腔健康相关生活质量(oral health-related quality of life, OHRQoL)已成为口腔医学中一项至关重要的患者中心结局指标,它反映了口腔疾病对个体躯体舒适度、功能状态、情感健康及社会交往等多方面的综合影响[1-4]。在正畸学领域,错殆畸形带来的负担不仅限于美观问题,更涉及咀嚼效能、言语功能、自尊心以及更广泛的社会心理适应能力[5-9]。随着患者在临床治疗中日益重视生活质量改善,探究各种正畸干预对OHRQoL的影响,已成为循证实践和医患共同决策的核心课题[10-14](Brazilian Clinical Trials Registry: ReBEC: RBR-9zytwf[13])。

日益增多的临床与流行病学研究揭示了错殆畸形严重程度、不同矫治方式(如固定矫治器、隐形矫治器、正颌手术)与患者报告结局之间的关联[10, 13, 15-16]。尽管取得了这些进展,相关文献仍分散于各专科期刊、区域性研究及多样化的研究方法之中。因此,一些关键趋势——如患者报告结局指标(patient-reported outcome measures, PROMs)的演变、手术与非手术技术的疗效比较,以及OHRQoL数据融入治疗计划等尚未得到系统的综合梳理[17-21]。

文献计量分析以其定量化、可视化的优势,可追踪学科发展轨迹、描绘协同网络、挖掘研究热点与前沿,进而揭示科学成熟度阶段、范式转变及奠基性成果[22-27]。然而,迄今为止,尚无文献计量研究系统性地考察正畸人群OHRQoL研究的整体格局。

为此,本研究以数据库建库至2025年12月检索获得的正畸领域OHRQoL相关英文文献为对象,开展文献计量学分析,旨在:①描述年度发表趋势及阶段性变化;②绘制作者和国家层面的合作网络;③基于关键词共现、聚类及时间线分析识别主要研究主题及其演化特征;④结合文献计量学结果讨论当前研究的不足与未来研究方向。通过理

清该领域的知识结构与主题变迁，本研究期望为正畸OHRQoL相关研究设计、国际协作及患者报告结局评价提供参考，并为研究者、临床医师及政策制定者提供决策依据，推动基于OHRQoL的正畸研究设计、协作策略及临床应用不断优化。

1　资料和方法

1.1　文献检索策略

本研究以Web of Science Core Collection与PubMed两个互补性数据库作为数据来源开展系统文献检索，以提高文献来源的全面性与代表性。检索截止日期为2025年12月，且对文献发表年份不设限制。为降低单一关键词检索可能导致的文献遗漏风险，在构建检索策略时，以“orthodontic”与“oral health-related quality of life”为核心主题词，同时纳入“OHRQoL”及其常用评价量表名称[口腔健康影响程度量表(Oral Health Impact Profile，OHIP)、儿童感知问卷(Child Perceptions Questionnaire，CPQ)、老年口腔健康评价指数(Geriatric Oral Health Assessment Index ，GOHAI)等]，并结合具体正畸相关术语(malocclusion、clear aligners、fixed appliances等)进行组合检索，从而在保证检索准确性的同时提高检索策略的敏感性与覆盖范围。

Web of Science Core Collection的检索式为：TS=("oral health-related quality of life" OR OHRQoL OR OHIP-14 OR OHIP OR CPQ OR GOHAI) AND TS=(orthodontic OR orthodontics OR malocclusion OR "clear aligner" OR aligner OR "fixed appliance" OR braces)。

PubMed的检索式为：("oral health-related quality of life"[Title/Abstract] OR OHRQoL[Title/Abstract] OR OHIP-14[Title/Abstract] OR OHIP[Title/Abstract] OR CPQ[Title/Abstract] OR GOHAI[Title/Abstract]) AND (orthodontic[Title/Abstract] OR malocclusion[Title/Abstract] OR "clear aligner"[Title/Abstract] OR aligner[Title/Abstract] OR braces[Title/Abstract] OR "fixed appliance"[Title/Abstract])。

文献类型限定为原创性研究(article)和综述(review)，语言限定为英语。所有检索结果均导出完整记录及被引参考文献(full record and cited references)，并保存为纯文本格式，用于后续文献计量分析。

1.2　纳入、排除标准与文献筛选

为保证研究数据的相关性与可重复性，本研究依据预设标准进行文献筛选。

纳入标准：①研究主题涉及正畸治疗、错𬌗畸形或正畸相关人群的OHRQoL；②研究对象为正畸患者、错𬌗畸形人群或接受正畸相关干预的人群；③研究涉及OHRQoL相关评价工具或患者报告结局指标，如OHIP、OHIP-14、CPQ、GOHAI等；④文献类型为原创研究或综述；⑤语言为英语。

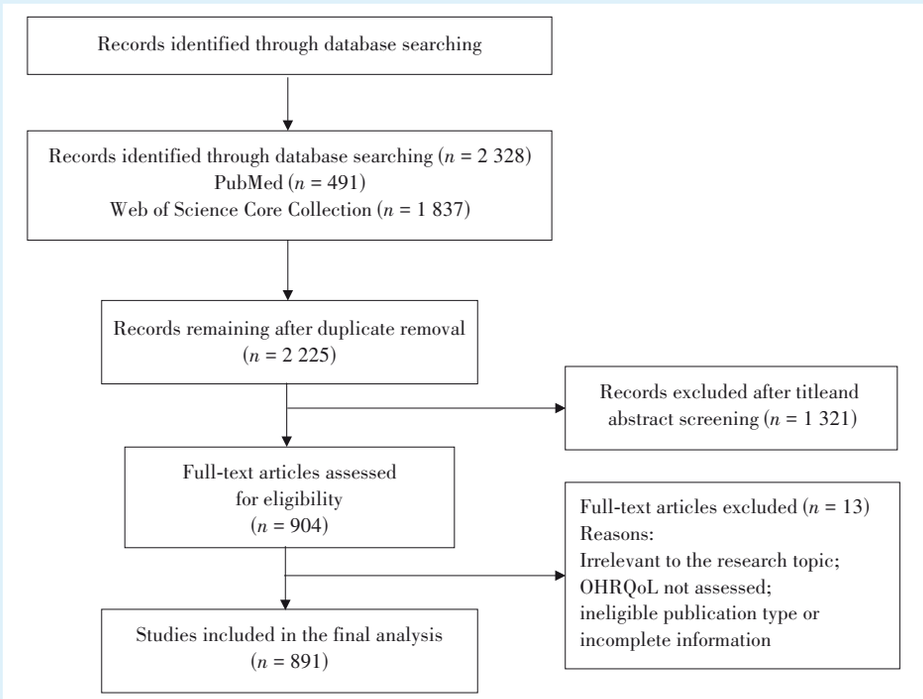
排除标准：①与正畸或OHRQoL主题不直接相关的研究；②会议摘要、书籍章节、社论、新闻报道等非原创研究或非综述性文献；③重复发表或数据库重复记录；④题录信息不完整、无法获取完整记录或无法进行文献计量分析的文献。

文献筛选分为三个阶段。首先，将Web of Science Core Collection和PubMed检索结果合并，依据数字对象标识符(digital object identifier，DOI)、PubMed文献标识号(PubMed identifier，PMID)、题名、第一作者、发表年份和期刊名称进行自动去重与人工复核。对于同一文献同时存在于两个数据库的情况，优先保留题录信息和被引参考文献较完整的记录。其次，由3名评审者独立阅读题名和摘要，排除明显不符合纳入标准的文献。最后，对可能符合标准的文献进行全文评估，并由评审组讨论确定最终纳入文献。若评审意见不一致，经讨论仍无法达成一致时，由第4名评审者裁定。

初始检索共获得2 328条记录，其中PubMed 491条、Web of Science Core Collection 1 837条。去除重复记录103条后，剩余2 225条进入题名和摘要筛选。经题名和摘要筛选排除1 321条记录后，904篇文献进入全文评估。全文评估阶段排除13篇文献，最终纳入891篇文献进行文献计量学分析。全文排除原因包括：与正畸治疗或错𬌗畸形人群不直接相关、未报告或未涉及OHRQoL相关指标、文献类型不符合纳入标准、题录或被引信息不完整等。具体筛选流程见图1。

1.3　文献计量学分析方法

本研究采用CiteSpace 6.1软件进行文献计量学可视化分析[28-33]。分析前对作者姓名、机构名称、国家名称及关键词进行标准化处理，以减少缩写、同义词及拼写差异导致的统计偏倚。例如，将“oral health related quality of life”“oral health-related quality of life”和“OHRQoL”统一处理；将“children”“child”等同义或近义表达进行规范化。



OHRQoL: oral health-related quality of life

Figure 1　Literature search and selection process for orthodontic OHRQoL research

图1　正畸OHRQoL研究文献的检索与筛选流程

CiteSpace参数设置如下：时间跨度为数据库最早收录年份至2025年，时间切片为1年；节点类型包括作者、国家、关键词和被引文献；节点筛选采用g-index，k=25；聚类标签提取采用对数似然比（log-likelihood ratio，LLR）算法；网络修剪方式和其余参数按照实际软件运行设置报告。关键词聚类质量采用模块度Q值和平均轮廓系数S值评价。Q值越高提示网络模块化结构越明显，S值越高提示聚类内部一致性越好。研究结果以合作网络图、共现网络图、聚类图和时间线图展示。

2　结　果

2.1　纳入文献类型及年度发表趋势

最终纳入891篇文献，其中原创研究793篇、综述98篇。纳入文献的实际发表年份为1995—2025年。年度发文量在2013年前总体较低，2013年后呈持续增长趋势，并于2022年达到峰值。2023—2025年发文量较峰值有所下降，但该变化可能受数据库收录延迟、检索截止时间和近年文献尚未完全索引等因素影响，不能简单解释为研究热度下降（图2）。上述结果提示，正畸OHRQoL研究在2013年前后出现较明显的增长转折，2014年后进入相对活跃的发展阶段。

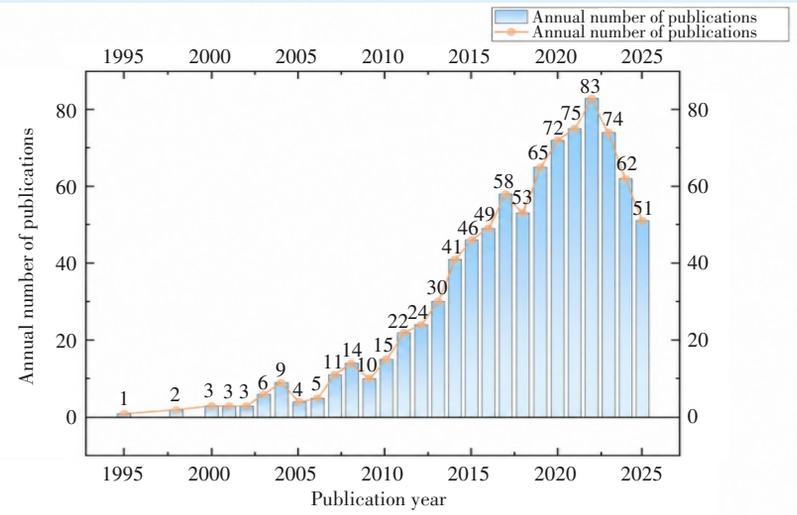
2.2　作者分析

作者合作网络由711个节点和1 003条连线组成，网络密度为0.004。节点大小代表作者发文量，连线代表作者间合作关系，连线越粗表示合作强度越高。整体网络密度较低，提示该领域作者合作相对分散，尚未形成高度集中的合作网络（图3，表1）。

Paiva Saul Martins发文量最高，共17篇。依据Price定律计算核心作者阈值M=3.09，因此将发文量≥4篇的作者界定为核心作者。共有51位作者达到该标准。需要指出的是，发文量和合作网络位置仅反映作者在本数据集中的产出和合作特征，不能直接等同于学术领导地位或研究质量。

2.3　国家分析

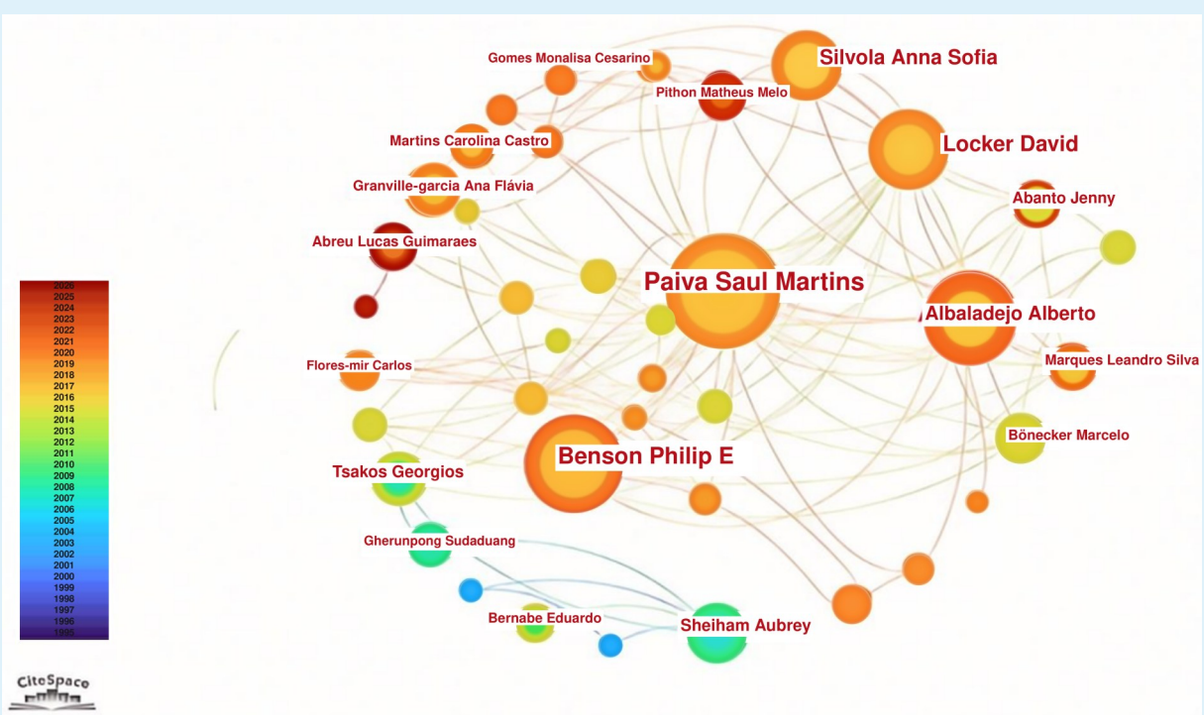
国家合作网络包含274个节点和451条连线，网络密度为0.012 1。节点代表国家或地区，连线代表国家间合作关系。巴西发文量最高，共161篇，占纳入文献总量的18.1%；其次为美国92篇、中国73篇、印度54篇和英国49篇。中介中心性方面，美国最高，为1.00；其后依次为巴西0.41、德国0.29、沙特阿拉伯0.18和丹麦0.17（表2、表3，图4）。



Annual publication trend in orthodontic oral health-related quality of life (OHRQoL) research from 1995 to 2025. The bars and overlaid line represent the number of publications per year, and the numerical labels indicate the corresponding annual counts. Annual publication output remained relatively low before 2013, increased markedly thereafter, and peaked at 83 publications in 2022. The analysis was restricted to complete publication years from 1995 through 2025

Figure 2　Annual publication trend in orthodontic OHRQoL research from 1995 to 2025

图2　1995—2025年正畸OHRQoL研究年度发文量变化趋势



Each node represents an author, and node size is proportional to publication output. The colored rings indicate publications in different time slices. Links represent co-authorship relationships, with thicker links indicating stronger collaboration. Link color indicates the time when the collaboration first appeared. Colors progress from cool colors for earlier years to warm colors for more recent years, as indicated by the color scale. OHRQoL: oral health-related quality of life

Figure 3　Author collaboration network in orthodontic OHRQoL research

图3　正畸OHRQoL研究作者合作网络图谱

中介中心性反映节点在合作网络中的连接作用。美国较高的中介中心性提示其在本研究数据集的国家合作网络中具有较强的桥梁作用，但该指标不应被直接解释为学术领导地位或研究质量优势。

表1　正畸OHRQoL研究发文量前5位的作者及其发文数量

Table 1　Top five most productive authors in orthodontic OHRQoL research and their publication counts

Rank	Author	Number of publications
1	Paiva Saul Martins	17
2	Albaladejo Alberto	9
3	Benson Philip E	8
4	Locker David	8
5	Silvola Anna Sofia	7

OHRQoL: oral health-related quality of life

表2　正畸OHRQoL研究发文量前5位国家及其中介中心性得分

Table 2　Top five countries by publication output in orthodontic OHRQoL research and betweenness centrality scores

Rank	Country	Number of publications	Centrality score
1	Brazil	161	0.41
2	United States	92	1.00
3	China	73	0.16
4	India	54	0.10
5	United Kingdom	49	0.14

OHRQoL: oral health-related quality of life

表3　正畸OHRQoL研究中介中心性前5位国家及其发文量

Table 3　Top five countries by betweenness centrality in orthodontic OHRQoL research and publication counts

Rank	Country	Centrality score	Number of publications
1	United States	1.00	92
2	Brazil	0.41	161
3	Germany	0.29	40
4	Saudi Arabia	0.18	41
5	Denmark	0.17	6

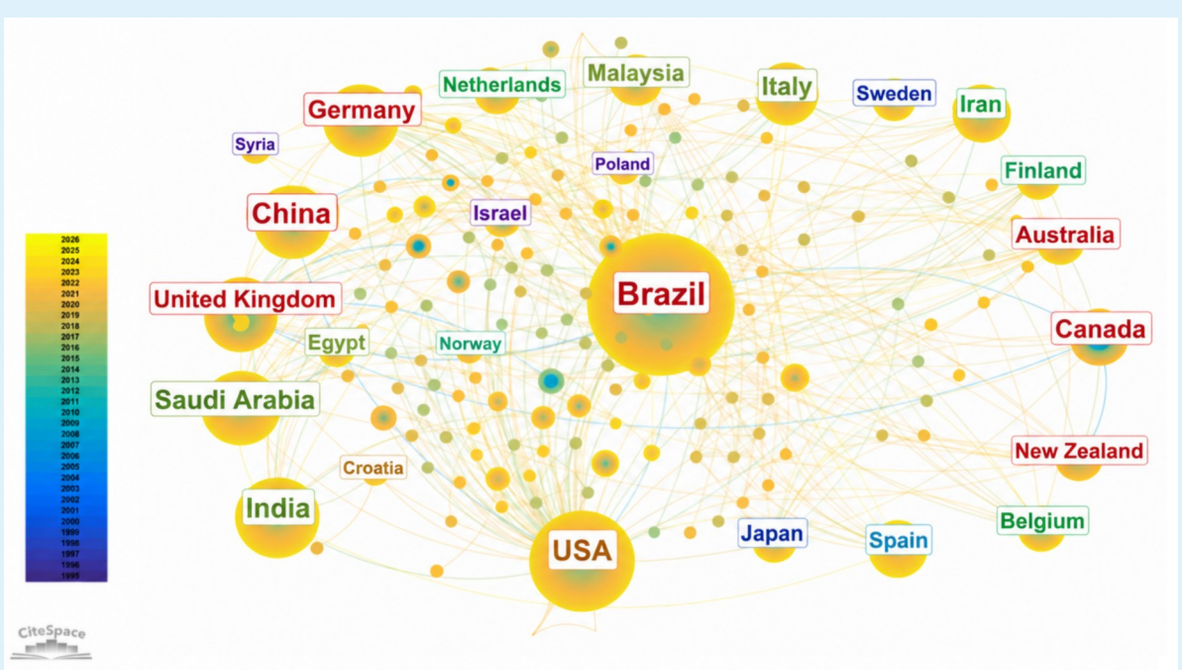
OHRQoL: oral health-related quality of life

2.4　参考文献分析

通过文献计量学分析，识别出本领域被引频次最高的研究文献。共有891篇文献被纳入统计，累计被引3 229次（图5）。同时，本研究筛选出本领域被引频次最高的10篇核心文献，以帮助研究者追溯文献来源，识别主要作者及出版机构。此举对于获取高质量学术文献具有重要指导意义（表4）。

2.5　关键词共现分析

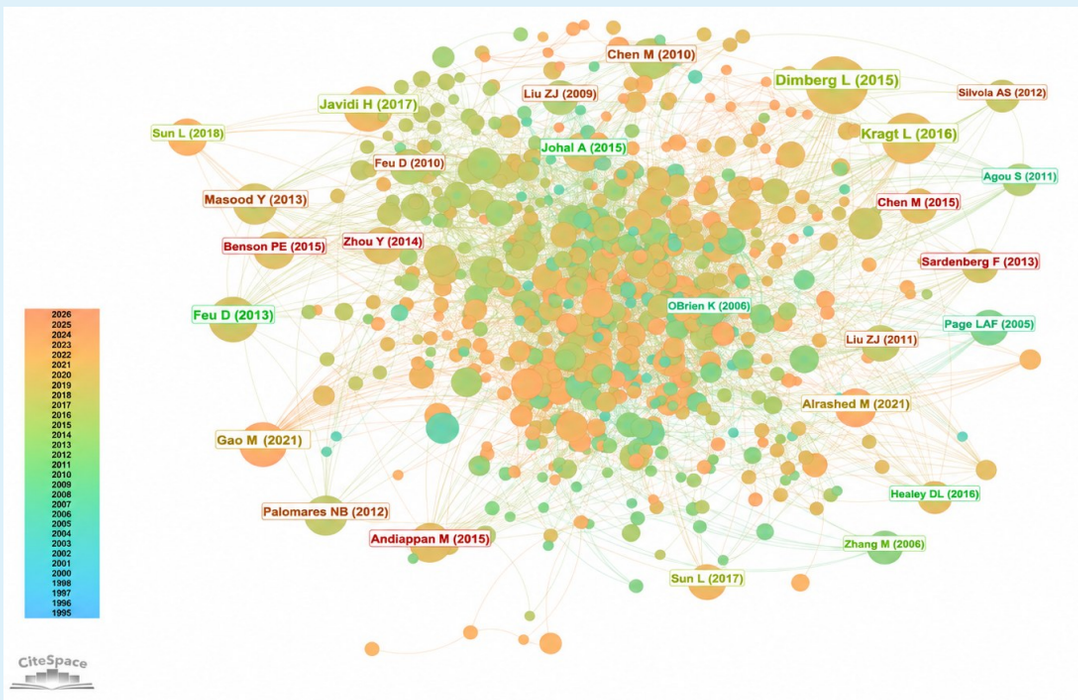
关键词共现网络包含527个节点和2 539条连



Each node represents a country or region, and node size is proportional to publication output. Links indicate international collaboration, with thicker links representing stronger collaboration. Node and link colors correspond to different time slices, progressing from cool colors for earlier years to warm colors for more recent years. A purple outer ring indicates high betweenness centrality, and a thicker ring represents a stronger bridging role in the collaboration network. OHRQoL: oral health-related quality of life

Figure 4　Country/region collaboration network in orthodontic OHRQoL research

图4　正畸OHRQoL研究国家（地区）合作网络图谱



Each node represents a cited reference, and node size is proportional to its citation frequency within the included dataset. Colored tree rings indicate citations in different time slices, and ring thickness reflects the number of citations in the corresponding time slice. Links connect references cited together by the same publication, with thicker links indicating stronger co-citation relationships. Link color indicates the time when the co-citation relationship first appeared. Purple outer rings indicate high betweenness centrality. OHRQoL: oral health-related quality of life

Figure 5　Co-citation network of cited references in orthodontic OHRQoL research

图5　正畸OHRQoL研究被引文献共被引网络图谱

线，网络密度为0.018 3（图6）。高频关键词包括quality of life、malocclusion、orthodontic treatment、oral health、children、orthognathic surgery、adolescents、self-esteem、orthodontic treatment need等。关键词分布显示，正畸OHRQoL研究主要围绕错𬌗畸形、正畸治疗、儿童青少年人群、正颌外科、疼痛、美学感知、自尊及治疗需求等方向展开（表5）。需要说明的是，关键词频次和中心性仅代表相关主题在文献中的出现频率和网络连接位置，不能直接推断其临床重要性、疗效大小或因果关系。

2.6　关键词聚类分析

基于关键词共现网络进行聚类分析，共识别出11个聚类（图7）。聚类网络的模块度Q值为0.397 8，平均轮廓系数S值为0.764 7，提示聚类结构具有一定区分度。根据聚类标签及关键词内容，可将本领域研究主题概括为五类：①正畸治疗需求评估；②不同正畸治疗方式与OHRQoL；③OHRQoL量表及患者报告结局工具；④儿童、青少年及特殊人群；⑤口腔健康与全身健康相关主题。上述聚类结果反映的是本数据集中关键词的共现结构，提示相关主题在文献中的相对集中程度，但不代表各主题的证据等级或临床推荐强度。

此外，本研究构建了反映该领域核心关系与演进路径的概念框架，关键逻辑流程如下：首先进行正畸治疗需求评估；在此基础上选择正畸治疗方式（手术矫治、隐形矫治、功能矫治）；继而借助OHRQoL评价工具对治疗效果进行量化；随后聚焦儿童与青少年人群及其家庭/代际因素；最终延伸至与全身健康结局相结合。

2.7　关键词时间线分析

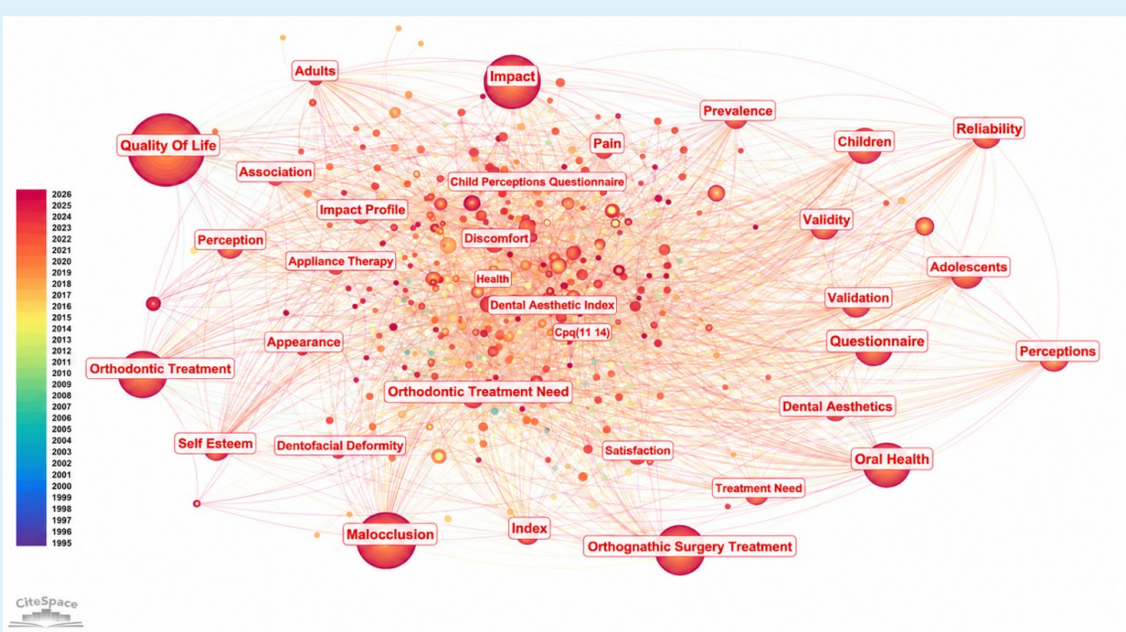
关键词时间线分析用于展示研究主题的时间演化（图8）。结果显示，早期研究主要围绕错𬌗畸形、治疗需求和生活质量等基础主题展开；随后，正畸治疗方式、正颌外科、固定矫治器、隐形矫治器及疼痛体验等主题逐渐增多；近年研究进一步扩展至患者报告结局、心理社会影响、儿童青少年量表验证、跨文化适应及口腔—全身健康关联等方向。该演化趋势提示，正畸OHRQoL研究的关注点由传统临床治疗评价逐步转向多维度、患者中心化的结局评估。

表4　正畸OHRQoL研究中被引频次前10位的文献及其基本信息

Table 4　Top 10 most frequently cited references in orthodontic OHRQoL research and their bibliographic information

Rank	Citation count	Year	Author	Journal	Title
1	36	2015	Dimberg L	*European Journal of Orthodontics*	The impact of malocclusion on the quality of life among children and adolescents: a systematic review of quantitative studies[34]
2	28	2016	Kragt L	*Clinical Oral Investigations*	The impact of malocclusions on oral health-related quality of life in children-a systematic review and meta-analysis[35]
3	23	2017	Javidi H	*American Journal of Orthodontics and Dentofacial Orthopedics*	Does orthodontic treatment before the age of 18 years improve oral health-related quality of life? A systematic review and meta-analysis[36]
4	22	2013	Feu D	*Angle Orthodontist*	Effect of orthodontic treatment on oral health-related quality of life[37]
5	21	2021	Gao M	*European Journal of Orthodontics*	Comparison of pain perception, anxiety, and impacts on oral health-related quality of life between patients receiving clear aligners and fixed appliances during the initial stage of orthodontic treatment[38]
6	20	2013	Masood Y	*Health And Quality of Life Outcomes*	Impact of malocclusion on oral health related quality of life in young people[39]
7	19	2010	Chen M	*Angle Orthodontist*	Fixed orthodontic appliance therapy and its impact on oral health-related quality of life in Chinese patients[40]
8	17	2015	Andiappan M	*Angle Orthodontist*	Malocclusion, orthodontic treatment, and the Oral Health Impact Profile (OHIP-14): systematic review and meta-analysis[41]
9	17	2012	Palomares NB	*American Journal of Orthodontics and Dentofacial Orthopedics*	How does orthodontic treatment affect young adults′ oral health-related quality of life[42]
10	16	2015	Johal A	*European Journal of Orthodontics*	The impact of orthodontic treatment on quality of life and self-esteem in adult patients[43]

OHRQoL: oral health-related quality of life



Each node represents a keyword, and node size is proportional to its occurrence frequency. Links indicate that two keywords appeared in the same publication, with thicker links representing stronger co-occurrence relationships. Node rings and link colors correspond to different time slices, progressing from cool colors for earlier years to warm colors for more recent years. Purple outer rings indicate high betweenness centrality, and thicker rings denote a stronger role in connecting different research topics. OHRQoL: oral health-related quality of life

Figure 6　Keyword co-occurrence network in orthodontic OHRQoL research

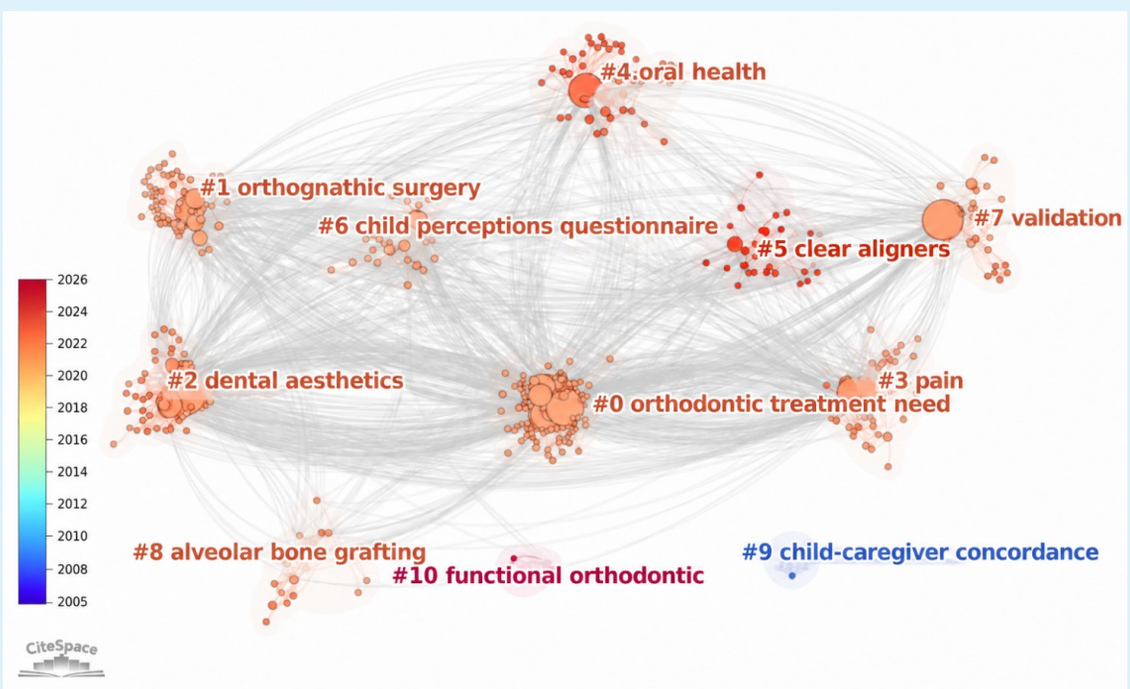
图6　正畸OHRQoL研究关键词共现网络图谱

表5　正畸OHRQoL研究出现频次和中心性得分前15位的关键词

Table 5　Top 15 keywords by occurrence frequency and centrality score in orthodontic OHRQoL research

Rank	Keyword (Frequency)	Keyword (Centrality)
1	Quality of life(287)	Oral health (0.19)
2	Malocclusion (143)	Orthodontic treatment (0.13)
3	Orthodontic treatment (129)	Orthognathic surgery (0.12)
4	Oral health (126)	Malocclusion (0.10)
5	Children (96)	Children (0.09)
6	Orthognathic surgery (74)	Orthognathic surgery treatment need (0.09)
7	Adolescents(66)	Adolescents (0.06)
8	Self esteem (49)	Adults (0.06)
9	Orthodontic treatment need (44)	Quality of life (0.05)
10	Dentofacial deformity(37)	Orthodontic treatment need (0.05)
11	Pain (26)	Dentofacial deformity (0.05)
12	Dental aesthetics (25)	Appearance (0.05)
13	Appliance therapy (25)	Self esteem (0.04)
14	Discomfort (23)	Impact profile (0.04)
15	Appearance (23)	Disease (0.04)

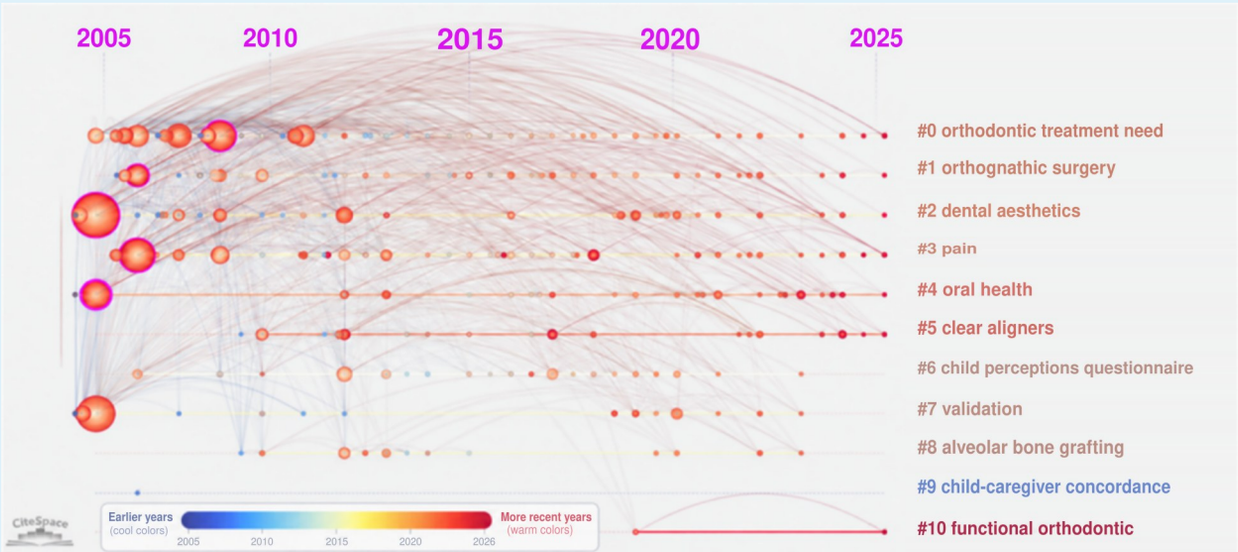
OHRQoL: oral health-related quality of life



Each node represents a keyword, and node size is proportional to its occurrence frequency. Links indicate keyword co-occurrence, with thicker links representing stronger relationships. Cluster labels were extracted using the log-likelihood ratio algorithm, and different cluster regions represent different research themes. Clusters are numbered in descending order of size, with smaller numbers indicating larger clusters; cluster #0 is the largest. Node and link colors correspond to different time slices. The network had a modularity Q of 0.397 8 and a mean silhouette S of 0.764 7. OHRQoL: oral health-related quality of life

Figure 7　Keyword clustering map of orthodontic OHRQoL research

图7　正畸OHRQoL研究关键词聚类图谱



The horizontal axis represents time, and each horizontal line represents a keyword cluster. Nodes represent keywords, and node size is proportional to occurrence frequency. The position and color of each node indicate the time slice in which the keyword appeared or was active. Links indicate keyword co-occurrence and thematic relationships, with thicker links representing stronger associations. Colors progress from cool colors for earlier years to warm colors for more recent years. Clusters are numbered in descending order of size, with cluster #0 being the largest. Purple outer rings indicate high betweenness centrality. OHRQoL: oral health-related quality of life

Figure 8　Keyword timeline showing thematic evolution in orthodontic OHRQoL research

图8　正畸OHRQoL研究主题演化的关键词时间线图

3　讨　论

就研究发展逻辑而言，该领域呈现出一定的范式转变特征。传统正畸疗效评价主要依赖客观咬合指标，如正畸治疗需要指数（index of orthodontic treatment need，IOTN）、正畸治疗复杂度、结果和需要指数（index of complexity, outcome and need, ICON）等[44-50]，而近年来，研究逐渐强调患者主观体验、疼痛、美学感知、自尊、社会交往及功能限制等多维结局[10, 13-15, 51-52]。根据库恩理论，范式转变通常表现为研究焦点、评价工具和方法体系的系统性重构[53]。正畸OHRQoL研究中的这一转变，主要体现为从单一临床指标向患者中心结局转变，从静态量表评价向动态监测和跨文化验证转变，从单学科治疗评价向多学科协作和个体化决策转变[13-14, 54-55]。

作者与国家合作网络显示，该领域研究参与者较多，但作者合作网络密度较低，提示研究团队之间的合作仍较分散，尚未形成高度稳定的核心合作群体。国家层面，巴西发文量最高，提示其在正畸OHRQoL研究中具有较高产出，这可能与其较高的正畸治疗需求、公共口腔卫生政策支持以及相关高产研究团队持续积累有关[56-58]。美国发文量位居第二，但中介中心性最高，说明其在本研究数据集的国际合作网络中具有较强桥梁作用。需要强调的是，发文量和中介中心性均属于文献计量学指标，只能反映产出规模和网络连接位置，不能直接等同于研究质量或学术领导地位。关键词共现、聚类及时间线分析提示，当前正畸OHRQoL研究主要集中于五个方向。第一，治疗需求评估与决策支持。未来应进一步整合客观咬合指标、患者主观需求和心理社会因素，构建更适用于临床初诊和医患共同决策的评估模型[59-62]。第二，临床治疗方式与OHRQoL。正颌手术、固定矫治、隐形矫治、功能矫治等不同方案均可能影响患者生活质量，但不同研究在随访时间、样本量和量表选择方面差异较大，因此仍需标准化、长期随访研究加以验证[63-65]。第三，OHRQoL评估工具开发[66-68]。11~14岁儿童感知问卷（Child Perceptions Questionnaire for 11-14-year-old children, CPQ11-14）[69-70]、口腔健康影响程度量表-14（Oral Health Impact Profile-14, OHIP-14）[38, 71]等量表已被广泛使用，但其跨文化适应性、最小临床重要差异和动态监测能力仍需进一步完善[15]。第四，特殊人群与家庭管理。儿童、青少年、唇腭裂及其他先天畸

形患者的OHRQoL评价需同时关注患者自评、照料者代理报告及家庭沟通模式，以提高治疗依从性和心理支持效果[72-74]。第五，口腔—全身健康整合[75]。现有证据相对较充分的方向主要集中于颅颌面形态、气道功能和睡眠相关结局[76-77]；而咬合与营养[78]、颞下颌关节紊乱病（temporomandibular disorders，TMD）[79]、头颈姿势[80]或系统性疾病[75]之间的关系仍存在争议，应避免将相关性直接解释为因果关系[81]。

本研究对正畸领域OHRQoL的研究趋势和未来方向进行了全面的文献计量学分析。通过整合Web of Science Core Collection和PubMed数据库的文献，本研究构建了广泛且多样化的高质量学术文献集合，从而提高了结果的稳健性。文献计量学方法有助于客观评价本领域研究趋势、核心主题及高影响力文献。此外，对关键词出现频次和中心性得分的考察，为揭示研究焦点的演变以及跨学科合作提供了有价值的见解，有助于指导未来的研究重点和临床实践。严谨的数据筛选和分析方法确保了结果的可靠性，并反映了当前正畸患者OHRQoL研究的现状。尽管本研究存在上述优势，但仍存在若干局限性。首先，仅依赖Web of Science Core Collection和PubMed两个数据库，可能遗漏未被这些平台收录期刊的相关研究，从而影响分析的全面性。其次，本研究可能存在语言偏倚，因为主要纳入英文发表的文献，可能忽视其他语言的重要研究成果。未来研究应考虑纳入更多数据库及多语种文献来源，以更全面、细致地理解正畸治疗中的OHRQoL。

【Author contributions】 Feng ZZ conducted the literature search and wrote the article. Liu YJ, Sun SL analyzed the data and reviewed the article. Xia Y, Feng ZY conceptualized and reviewed the article. All authors read and approved the final manuscript as submitted.

【Ethics statement】 The authors have nothing to report.

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【Data availability statement】 The original contributions presented in this study are included in the article. Further inquiries can be directed to the corresponding author upon reasonable request.

【Generative AI statement】 The authors declared that generative AI was not used in the creation of this manuscript.

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