English Oral and Maxillofacial Surgery Research Articles: Move and Phrase Frames in the Introduction Sections

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Abstract

While many previously published studies have investigated the moves, steps and their structure of research article (RA) sections in various academic fields, such studies are rare in the discipline of Dentistry. Besides, prior research has been conducted on phrase frames of RAs in some fields, but phrase frames in Dentistry RAs have received scant attention. Hence, the current study aims to explore the rhetorical structure and phrase frames of English RA Introduction sections in the Oral and Maxillofacial Surgery (OMS) sub-discipline of Dentistry. A total of 30 articles from 3 renowned journals were collected and their Introductions were analyzed based on the frameworks of Kanoksilapatham (2005) for the move structure and Gray and Biber (2013) and Simpson-Vlach and Ellis (2010) for phrase frames, respectively. The results showed that the OMS Introductions exhibit 3 moves, i.e., Move 1: *Announcing the importance of the study*, Move 2: *Preparing for the present study*, and Move 3: *Introducing the present study*, and 3 new steps that illustrated the disciplinary features of Dentistry. The study also found 46 phrase frames in the structural and functional categories. These findings provide insights about the two significant rhetorical features of OMS RA Introduction sections and serve as useful resources in the English for Dentistry Purposes (EDP) teaching, learning, and research publication.

Keywords: Dentistry, English for Dentistry Purposes, move-step structure, phrase frames, Oral and Maxillofacial Surgery, research article Introduction

1. Introduction

In recent years, studies on English for Dentistry Purposes (EDP) have been an emerging interest in exploring the language uses in research writing of healthcare professionals (Lasekan et al., 2022; Khazaie & Derakhshan, 2024). As non-native authors, doctors of Dental Sugery (DDS authors) face challenges in writing English manuscripts, particularly regarding the rhetorical structure and phrase frames that are suitable to report discipline-specific content. A study by Raffing et al. (2021) on the difficulties doctors face when writing a manuscript for international publication highlights some emerging causes, including inadequate research training, shortage of time of writing and submission, insufficient capacity of English language proficiency, and barriers to start writing. Similar findings were also reported in Sprague et al. (2003), Pololi et al. (2004), Nasef et al. (2011), Baufreton et al. (2012), Binderup et al., (2012), and Duracinsky et al. (2017). Essentially, these studies show that lack of available resources in terms of sufficient expressions, words, and textual organizations in the EDP community has been identified as one of the substantial reasons that prevent doctors from publishing their manuscripts (Shah et al., 2009).

Like other disciplines in the group of health sciences, English RAs in Dentistry have been recognized as a communication form and an important channel for constructing authors' identity in the EDP discourse community. The RAs in this discipline should have their own distinctive features in move-step structure and phrase frames, so it is important to examine conventional structures and phrase frames in each RA section in order to arrive at useful and practical framework and guidelines for RA compositions (Thanajirawat & Chuea-nongthon, 2022). Hence, there is obviously a need for investigating move-step structure and phrase frames of English RAs in this field. Previous studies show scant research about move-step structures in the RAs in the discipline of Dentistry. As each discipline has its own distinctive rhetorical characteristics, genre scholars conduct studies about move-step structure to realize those disciplinary features. For example, Basturkmen's (2012) genre-based investigation of Dentistry RA's Discussion section finds the typical moves, steps, and their sequences that serve as useful references in disciplinary research writing for publication. Alsyousef (2021) carries out a move analysis of RA abstracts in Dentistry to investigate the disciplinary similarities and differences among 8 sub-disciplines of Dentistry, including Oral Sciences, Periodontics, Restorative Dentistry, Endodontics, Operative Dentistry, Prosthodontics, Oral and Maxillofacial Surgery, and Orthodontics. However, the rhetorical structure and phrase frames in terms of structural and functional categories in OMS RA Introduction sections in Dentistry have not been investigated by any previous studies.

Oral and Maxillofacial Surgery (OMS) is one of 12 sub-disciplines of Dentistry. It focuses on diagnosis and clinical treatment of any disfunction or problems of the mouth, jaws, face, neck, and neighboring areas (Balaji & Balaji, 2018). It is also significant because of the

following reasons. Firstly, effective solutions in this Dentistry sub-discipline are found to treat the traumatic and degenerative diseases which can cause tissue loss (U.S. Department of Health and Human Services, 2007). Secondly, in the United States, craniomaxillofacial injuries are identified as one of the most challenging treatments since they require specialized practitioners, advanced diagnostic imaging modalities, skilled and professional services, and high-tech instrument (Bell, 2007). Thirdly, maxillofacial trauma, experienced in the first trauma level centers or hospitals, share the similar challenges in oral and maxillofacial surgery, plastic surgery, and otolaryngology. Finally, most state trauma systems are burdened by lacking of workforce training for new dental surgeons, decreasing reimbursement in medical services, and increasing number of uninsured patients and the specializations (Vanlandingham & Marone, 2004). All of these underscore the significance of OMS specifically and of Dentistry in general. However, due to lack of writing training and useful resources about move-step structure and phrase frames of individual RA sections, the number of publications in Dentistry is still limited. Therefore, there is a need for OMS RA analysis to contribute to the literature. This research aims to seek for the answers of the following questions:

1. What are the moves, steps, and their structure of the English OMS RA Introduction sections?

2. What are the phrase frames in terms of structural and functional categories used in the English OMS RA Introduction sections?

2. Literature Review

2.1 Move-step Structure in the RA Introduction Sections in Different Disciplines

The Introduction section plays an important role to generate the overview of the study. In terms of its writing, it follows step-by-step a highly conventional pattern to express the communicative purposes to provide background information about the research topic and to link it with previous studies. The section also identifies the significance and value of the research being reported for further academic promotion (Swales, 2004). It also serves as avenue to persuade the international scholars about the significance of the research (Lim, 2010). Hence, there are a large number of scholars investigating the Introduction section. According to Swales (2004), there are 3 moves (i.e., Move 1: *Establishing a territory*, Move 2: *Establishing a niche*, and Move 3: *Occupying the niche*) in the RA Introduction sections. This structure has been an influential framework for a series of subsequent studies on the Introduction sections. In the literature, several researchers have explored the Introduction section in different fields, with some focusing on the disciplines related to Health Sciences to which Dentistry which is the focus of the current study belongs.

To begin with, Nwogu (1997) investigates the move-step structure of the RA Introduction sections in the field of Medicine in a corpus of 30 articles collected with 15 articles by using Swales' (1981,1990) framework. The results show 3 moves in the RA Introduction sections, which is the same as the original framework. Kanoksilapatham (2005) explores move-step structure of RA Introduction sections in Biochemistry in a corpus of 60 RAs from 5 high-ranking journals based on Swales' (1990) framework. The results show 3 moves found in this section and follow a cyclical pattern, which illustrates the complex level of the study being reported. Davis (2020) investigates the rhetorical structure of Medicine RA in a corpus of 250 articles between 2001 and 2011 by utilizing Nwogu's (1997) framework. The results show 3 moves and 8 steps in the corpus, and Move 1: *Describing the study and situation* is the most frequently employed in the study. In addition, Meng (2021) explores the rhetorical structures of RA Introduction sections in the discipline of Medical Sciences in a corpus of 30 RA articles from 25 high-ranking journals by utilizing Kanoksilapatham's (2005) framework. The results show 3 moves similar to the original model and the writers tend to present the general knowledge of the target study and review previous theories, avoid emphasizing the statements of the problems in the RAs, and claim the significance of the target study in this introductory section. Last but not least, Zhao and Pramoolsook (2023) explore the move-step structure of RA Introduction sections in the field of Traditional Chinese Medicine in a corpus of 40 articles from five high ranking journals between 2020 and 2021 based on Kanoksilapatham's (2005) framework. The results show that Move 1: *Announcing the importance of the field* is the most frequently found move with 85 occurrences in the study.

The findings from these studies provide useful resources of the Introduction section for teachers and students to enhance their awareness of communicative purposes and linguistics features, which can improve their academic writing ability for international publications. Besides, the findings also serve as useful guidelines to novice researchers to understand the move-step patterns that RAs in these disciplines usually follow. However, more research should be also carried out in other disciplines in the group of Health Sciences, including Dentistry and its sub-disciplines.

2.2 Phrase Frames in the RA Introduction Sections in Different Disciplines

Phrase frames (PFs) are commonly used linguistic structures that guide how certain concepts or arguments are expressed. These frames help organize information, make the writing clearer, and establish coherence within a specific discipline's conventions. They often consist of recurring phrases or sentence structures that reflect typical ways of presenting findings, discussing theories, or introducing research topics (Gray & Biber, 2013; Grabowski, 2015; Ang & Tan, 2019; Cortes, 2023; Appel et al., 2024; Hong, 2024; Mathew & Mccallum, 2024; Wu et al., 2024). Previous studies show that there are two common ways to categorize phrase frames, i.e., structural and functional categories. Firstly, structural analysis of phrase frames examines the form and arrangement of words within a phrase frame. It focuses on identifying phrase types such as noun phrases, verb phrases, adjective phrases, adverb phrases, etc. In the literature, Gray and Biber (2013) classified them into three major types: verb-based, other-content-word, and function-word phrase frames. Secondly, functional analysis of phrase frames examines the role that phrase frames play within a sentence, focusing on their contribution to the overall meaning and function of the sentence. Simpson-Vlach and Ellis (2010) also propose another way to functionally categorize the phrase frames, which consists of three main types: referential, stance, and discourse organizing phrase frames.

In the existing literature, three previous studies have investigated the phrase frames of the RA Introduction sections. Firstly, Lu et al. (2018) study phrase frames in RA Introduction sections from Anthropology, Applied Linguistics, Economics, Political Science, Psychology, and Sociology in a corpus of 600 articles from five prestigious journals from the 2012-2016 period based on Fletcher's (2012) framework. The results idenitifed two categories of PFs. For the structural type, 454 phrase frames were found with more five-word than six-word frames. For the functional category, more five-word than six-word frames were found. Secondly, Lu et al. (2021a) examine the phrase frames in 500 RA Introduction sections in social sciences from five international journals between 2012-2016. The results show 3 types of phrase frames, i.e., specialized, semi-specialized, and non-specialized phrase frames. The findings report 149 phrase frames in Move 1 which has the most utilized phrase frames in the RA Introduction sections. Thirdly, a study by Lu et al. (2021b) investigated phrase frames in 500 RA Introduction sections in five disciplines in Social Sciences. The results show that different phrase frames (frequencies/number of journals) are found in different disciplines, e.g., *in this article I* * in Anthropology (13/12), *the role of* * in Applied Linguistics (13/10), *in this article we* * (19/18) in Political Science, *about the nature of* * (11/3) in Psychology, and *in this article we* * (19/19) in Sociology.

Taken together, the findings from the three studies offer useful pedagogical implications to academic writing and significant contributions to teaching and learning practice. Besides, some important variations are identified across the disciplines in terms of move-step structure and phrase frames, which enrich understanding of disciplinary variations useful for writing scientific research to meet specific conventions required by different academic disciplines. However, little is known about the frequency, patterns and functions of phrase frames used in OMS RA Introduction sections. Besides, more research on RA Introduction sections should be carried out and provide an in-depth knowledge for scholars, doctors, teachers, and students for their genre-specific RA writing, especially in the field of Dentistry.

3. Methodology

3.1 The Corpus

The current corpus consists of 30 RA Introduction sections from 3 renowned journals in OMS. The reason for this corpus size is the recommendations from previous studies (Yang & Allison, 2003; Kanoksilapatham, 2005; Stoller & Robinson, 2013; Shi & Wannaruk, 2014; Zhao & Pramoolsook, 2023), to be appropriate for move analysis. For the selection criteria of journals, they meet the requirements from Nwogu's (1997) criteria in terms of representativeness, reputation, and accessibility as well as the suggestions from the disciplinary experts, so the chosen journals were *International Journal of Oral and Maxillofacial Surgery*, *Journal of Cranio-Maxillofacial Surgery*, and *International Journal of Oral and Maxillofacial Implants*. For the articles, they are 3 articles from 3 volumes of each journal, published in the 2021-2023 period, and they follow the IMRD structure to increase the validity of the study (Li & Pramoolsook, 2015).

3.2 Data Analysis

To answer the research questions of the current study, the analysis involved 2 types, i.e., move-step and phrase frames analysis. First, the move-step investigation adapted Kanoksilapatham's (2005) move-step framework for analysis due to the following reasons. This framework was established from Swales's (1990) framework and widely utilized as the analytical framework in different disciplines (Stoller & Robinson, 2013; Shi & Wannaruk, 2014; Gao & Pramoolsook, 2021). Besides, this framework is also utilized to analyze RAs in hard sciences or health sciences disciplines for further modification (Kanoksilapatham, 2005; Zhao & Pramoolsook, 2023). Since the framework from Kanoksilapatham (2005) may not address several potential steps that can appear in the English RAs in Dentistry, some other well-established frameworks are also consulted when necessary, e.g., Swales's (2004) and Samraj's (2002) frameworks. The proposed framework can consist of additional steps that cover the communicative purposes in some text segments of the current corpus.

In this research, two disciplinary insiders were invited for giving consultancy on journal selection, RA content clarification, and other disciplinary insights. Another inter-coder was invited to analyze the data with the current researchers. He is an MA holder in Applied Linguistics and had experienced teaching English in Dentistry courses, so he has primary knowledge to read and understand what is expressed in OMS articles. A session was conducted to train the inter-rater and, then, the Introductions were analyzed and inter-rater reliability check by percent agreement. The results showed that the inter-rater reliability (>90%) satisfied for coding the rest of data.

There were 4 stages in the analysis of the move-step structure of OMS RA Introduction sections. Firstly, the RAs were skimmed through to get an overview about the titles, headings, sub-headings, and content of the articles. This step was done with careful and precise reading to ensure the quality of the initial data content before starting the coding process. Any misunderstanding in terms of specialized knowledge was consulted with the disciplinary insiders for more clarifications. Secondly, moves and steps were determined by their communicative purposes using the chosen framework adapted in the current study, i.e., Kanoksilapatham (2005). Two crucial elements, i.e., linguistic signals and cognitive judgement, were taken into account. Thirdly, the inter-rater reliability was measured to ensure the accurate identification of moves and steps. Finally, new moves or steps if identified were added into the framework based on the mentioned coding process. The definitions of moves and steps were reviewed again to ensure the full understanding of the communicative purposes of each text segment in the corpus. For the cut-off frequency, recommendations from previous studies were utilized to set a cut-off threshold. Kanoksilapatham (2005, 2011) suggests the cut-off frequency of moves and steps, which is also followed in the subsequent studies (e.g., Amnuai & Wannaruk, 2013; Saeeaw & Tangkiengsirisin, 2014, Zhang & Wannaruk, 2016; Changpueng & Patpong, 2021; Alyousef, 2021a, 2021b; Zhao & Pramoolsook, 2023). Hence, in our analysis, the cut-off frequency was determined, as follows. An obligatory move or step appears in all of articles (100%) while the range from 60-99% was considered as conventional moves or steps. The frequency of less than 60% was optional moves or steps.

Secondly, there were 4 stages in the analysis of phrase frames of OMS RA Introduction sections. First, 30 RAs were converted into txt. files and the researchers used kfNgram (2012) to extract the phrase frames automatically. Secondly, the researchers refined the extracted data manually. In this stage, the researchers and invited coder worked independently on 30% of the whole data, and discussed any disagreements on the identification of phrase frames. Thirdly, prior research showed Gray and Biber's (2013) taxonomy for structural analysis and Simson-Vlach and Ellis's (2010) taxonomy for functional analysis, so the researchers followed these studies to categorize the phrase frames. Finally, 4 informants were invited to provide the general ideas about how useful the identified phrase frames could be for the learning, teaching, and research purposes. In this stage, the researcher contacted four informants, i.e., two teachers and two students, based on the following criteria. The invited teachers are currently associate professors, including a language teacher in Linguistics and a doctor in Dentistry, and have experienced in teaching academic writing courses. Meanwhile, the students are MA holders, and enroll in a graduate program in Education, specializing in TESOL, in Australia.

3.3 The Inter-rater Reliability Check of Moves, Steps and Phrase Frames in OMS RA Introduction Sections

In the study, 9 Introductions from 3 journals were selected based on the stratified and random selection for the inter-rater reliability check. They were coded independently by one of the researchers and an invited coder. The number of chosen articles was well considered due to the following reasons. Recommendations from the previous studies (Shi & Wannaruk, 2014; Parkinson, 2017) confirm the common benchmark from 20% to 30% to be adequate for the inter-rater agreement. The results showed the high consistency (>92%) of between two coders in inter-rater agreement, as illustrated in Table 1. The discrepancy of moves and steps was discussed until the two coders reached consensus.

Table 1. The inter-rater agreement of move-step structure, structural and functional analysis of phrase frames in OMS RA Introduction sections

Categories	Coded Unit	Agreed Codings	Different Codings	Agreed Percentage
Move-step Structure Analysis				
Move 1	26	24	2	92.86
Move 2	9	9	0	100
Move 3	12	12	0	100
Total	48	46	2	
Structural Analysis of Phrase Frames				
Verb-based PFs	3	3	0	100
Other-content-word PFs	9	9	0	100
Function-word PFs	2	2	0	100
Total	14	14		
Functional Analysis of Phrase Frames				
Referential PFs	10	10	0	100
Stance PFs	2	2	0	100
Discourse organizing PFs	2	2	0	100
Total	14	14		

3. Results

3.1 Results and Discussion of the Move-step Structure in OMS RA Introduction Sections

3.1.1 Move Frequency, Status, Cycles and Structure

Based on the framework of Kanoksilapatham (2005), the findings of the current study proposed a framework of 3 moves for OMS RA Introduction sections. Besides, 10 steps were also found with 3 new steps identified, i.e., M1S4: *Generalizations from previous studies* in Move 1, M2S3: *Presenting positive justification* in Move 2, and M3S3: *Introducing methods/equipment* in Move 3.

Table 2. The Number of RAs in which Move or Step Occurs in OMS RA Introduction sections

Introduction	No. of RAs	Percentage	Occurrences	Percentage
Move 1: *Announcing the importance of the field*	30	100	72	19.41
M1S1: *Claiming the centrality of the topic*	13	43.33	14	3.77
M1S2: *Making topic generalizations*	28	93.33	47	12.67
M1S3: *Reviewing previous research*	29	96.67	59	15.90
M1S4: *Generalizations from previous studies*	18	60.00	19	5.12
Move 2: *Preparing for the present study*	24	80.00	38	10.24
M2S1: *Indicating a gap*	7	23.33	8	2.16
M2S2: *Showing the problems*	17	56.67	23	6.20
M2S3: *Presenting positive justification*	14	46.67	19	5.12
Move 3: *Introducing the present study*	30	100	35	9.43
M3S1: *Stating purpose(s)*	29	96.67	29	7.82
M3S2: *Presenting hypotheses*	2	6.67	2	0.54
M3S3: *Introducing methods/equipment*	4	13.33	6	1.62

Table 2 shows the number of moves and steps and their occurrences that appear in the OMS RA Introduction sections. At the move level, Move 1: *Announcing the importance of the field* in this Dentistry sub-discipline was a predominant move, which appeared in 30 RAs

(100%) and 72 times (19.35%) in the corpus. Move 2: *Preparing for the present study* occurred 38 times (10.24%) in 24 RAs (80%) in the data. Move 3: *Introducing the present study* appeared all 30 RAs (100%) and 35 times (9.41%). At the step level, in Move 1, M1S3: *Reviewing previous research* were identified in 29 RAs (96.67%) and 59 times (15.86%) in OMS, which is the most frequent in the section. The second most found step was M1S2: *Making topic generalizations* identified in 28 RAs (93.33%) and 47 times (12.63%). In Move 2, M2S1: *Indicating a gap* occurred in 7 RAs (23.33%) with 8 times (2.15%), M2S2: *Showing the problems* in 17 RAs (56.67%) with 23 times (6.18%), and M2S3: *Presenting positive justification* in 14 RAs (46.67%) with 19 times (5.11%). In Move 3, M3S1: *Stating purpose(s)* was the predominant step in this move found in 29 RAs (96.67%) with 29 times (7.80%). Besides, M3S2: *Presenting hypotheses* appeared in 2 RAs (6.67%) with 2 times (0.54%), and M3S3: *Introducing equipment/methods* was found in 4 RAs (13.33%) with 6 times (1.98%).

Table 3. The Obligatory, Conventional and Optional Moves and Steps in the OMS RA Introduction sections

Status	Moves and steps
Obligatory (100%)	**Move 1: *Announcing the importance of the field***
	Move 3: *Introducing the present study*
Conventional (60%–99%)	**Move 2: *Preparing for the present study***
	M1S2: *Making topic generalizations*
	M1S4: *Generalizations from previous studies*
	M3S1: *Stating purpose(s)*
	M1S3: *Reviewing previous research*
Optional (< 60%)	M1S1: *Claiming the centrality of the topic*
	M2S1: *Indicating a gap*
	M2S2: *Showing the problems*
	M2S3: *Presenting positive justification*
	M3S2: *Presenting hypotheses*
	M3S3: *Introducing methods*

Table 3 shows the status of the moves and steps of 30 OMS RA Introduction sections. For the obligatory category, there were 2 moves, i.e., Move 1: *Announcing the importance of the field*, and Move 3: *Introducing the present study*, which appeared 100% of RAs. For the conventional category, there were Move 2: *Preparing for the present study* and 4 steps, i.e., M1S2: *Making topic generalizations*, M1S3: *Reviewing previous research*, M1S4: *Generalizations from previous studies*, and M3S1: *Stating purpose(s)* in this Dentistry sub-discipline. For the optional category, one step in Move 1, 3 steps in Move 2, and three steps in Move 3 appeared less than 60%, which were M1S1: *Claiming the centrality of the topic*, M2S1: *Indicating a gap*, M2S2: *Showing the problems*, M2S3: *Presenting positive justification*, M3S2: *Presenting hypotheses*, and M3S3: *Introducing equipment/methods*.

Table 4. A Summary of Move Cycles in OMS RA Introduction Sections

No.	Move cycles	No. of RAs	Percentage
1	M1S2-M1S3	16	59.25
2	M1S3-M1S4	16	59.25
3	M2S2-M3S1	6	22.22
4	M1S2-M1S4	8	29.62
5	M2S3-M3S1	8	29.62
6	M2S3-M3S1	12	44.44
7	M2S2-M2S3	9	33.33
8	M1S1-M1S3	6	22.22
9	M1S1-M1S3	7	25.92

Table 4 reports the move cycle of OMS RA Introduction sections. Move cycles M1S2-M1S3 and M1S3-M1S4 with 16 occurrences (59.25%) were the most employed cycles in the corpus. The next frequent move cycles are M2S3-M3S1 with 12 times (44.44%), M2S2-M2S3 with 9 times (33.33%), M1S2-M1S4 and M2S3-M3S1 with 8 times (29.62%), and M1S1-M1S3 with 7 times (25.92%). The last move cycle was M2S2-M3S1 and M1S1-M1S3, which appeared 6 times (22.22%) in the corpus.

3.1.2 Description of Moves and Steps

This section offers examinations on specific moves and steps identified in the current corpus based on their communicative purposes. The excerpts of the moves and steps in this Dentistry sub-discipline are also provided with more interpretations. Overall, the OMS RA Introduction sections in the current study consisted of 3 moves reported in Kanoksilapatham's (2005) framework. However, several new steps were found, which could be specific in OMS RA Introduction sections.

Move 1: *Announcing the importance of the field*. The communicative purpose of this move is to explore the essential role of the general and specific field of study, which shows the significance and impacts of the understudied field from different perspectives. This move can be accomplished by 4 steps, i.e., M1S1: *Claiming the centrality of the topic*, M1S2: *Making topic generalizations*, M1S3: *Reviewing previous research*, and M1S4: *Generalizations from previous studies*. In Swales (2004), this move introduces the background of the research area by mentioning the present circumstance of the research being reported. In the current study, this move was the introductory part of the Introduction section, which occurred in all the 30 RAs, so this move was obligatory. This result is similar to that in Medical Sciences (Meng, 2021), Biochemistry (Kanoksilapatham, 2005), Electronic Engineering (Gao & Pramoolsook, 2023), and Traditional

Chinese Medicine (Zhao & Pramoolsook, 2023).

M1S1: ***Claiming the centrality of the topic***. The communicative purpose of this step is to point out the fundamental knowledge of the topic and to confirm the well-established and important research topic to conduct in the study being reported. Linguistic clues in this step include "essential", "prevalent", "important", "the most common", "a major problem", "one of unique importance", "one of the most controversial topics", or "a subject of interest in a large number of studies". This step occurred in 13 articles (43.33%), so it was an optional step in this Dentistry sub-discipline. Excerpt 1 demonstrates this step.

Excerpt 1:

Restoration in the esthetic zone with implant supported prostheses is one of the most difficult procedures to achieve in maxillofacial surgery. (OMS7)

M1S2: ***Making topic generalizations***. The communicative purpose of this step is to provide the subject of the study by presenting the background or the phenomenon existing in the context of the study being reported. Linguistic clues include "is widely used", "is defined as", "originally defined as", "were defined as", "is characterized by", or "is commonly described as". This step occurred in 28 articles (93.33%) in OMS, so it was a conventional step in this Dentistry sub-discipline. Excerpt 2 is an illustration of M1S2.

Excerpt 2:

Buser et al8 defined success as "the absence of peri-implant infection, absence of pain or subjective discomfort, absence of a continuous radiolucency around the implant, and absence of clinically detectable implant mobility," while survival is defined as an implant that is still in function, without considering the success criteria.9 (OMS5)

M1S3: ***Reviewing previous research***. The communicative purpose of this step is to examine the past studies relevant to the study being reported in order to provide support or justification for the study being reported. This step occurred in 29 articles (96.67%) in OMS, so it was a conventional step in this Dentistry sub-discipline. Excerpt 3 shows an example of M1S3.

Excerpt 3:

Clinical and experimental studies have shown that critical-sized bone defects simulating the extraction socket cannot spontaneously heal without the use of any osteopromotive material.2 (OMS3)

M1S4: ***Generalizations from previous studies*****.** The communicative purpose of this step is to make conclusions based on the previous studies reviewed. Hence, this step usually follows M1S3: *Reviewing previous studies* to provide summaries of evaluation about key findings from the literature reviewed. Besides, it was also found similarly in Meng's (2021) study, which showed the cycle of reviewing prior research and making conclusions. This step occurred in 18 articles (60.00%) in OMS, so it was a conventional step in this Dentistry sub-discipline. This frequency was higher than the one in Meng (2021) with 40%. Excerpt 4 illustrates this step.

Excerpt 4:

(... previous studies). Hence, the involvement of HPV infection in OSCC carcinogenesis in the Netherlands seems to be limited. (OMS13)

Move 2: ***Preparing for the present study***. The communicative purpose of this move is to identify the problems in the current literature and to assert a specific issue which needs to be addressed. This move can be realized by three steps: M2S1: *Indicating a gap*, M2S2: *Showing the problems*, and M2S3: *Presenting positive justification*. In the current study, this move occurred in 24 articles (88.88%) in OMS, so it was a conventional move in this Dentistry sub-discipline.

M2S1: ***Indicating a gap***. The communicative purpose of this step is to point out the lack of previous studies in the phenomenon being investigated in the study. There are three types of linguistic signals, i.e., conjunctive words, negative adjectives, and words referring to the limitations of prior research, in this step. Examples of these linguistic signals were "however", "although", "limited", "unknown", "few", or "little". This step occurred in 7 articles (23.33%) in OMS, so it was an optional step in this Dentistry sub-discipline. Excerpt 5 demonstrates this step.

Excerpt 5:

The long-term effect on speech and articulation outcomes after TLA and subsequently cleft palate repair is unknown. (OMS30)

M2S2: ***Showing the problems***. The communicative purpose of this step is to stress the impact of a problem that needs to be addressed or the negative effect of a treatment that needs to be replaced and improved. There are two types of linguistic signals, i.e., conjunctive words and negative adjectives, in this step. Examples of these linguistic signals are "although", "even though", "ambiguity", "failure", "drawback", or "lack". This step occurred in 17 articles (56.67%) in OMS, so it was a conventional step in this Dentistry sub-discipline. Excerpt 6 is an illustration of M2S2.

Excerpt 6:

Clinical knowledge on parotid SCC is far from comprehensive, and it is still difficult to make an early diagnosis and determine the most appropriate treatment for this malignancy. (OMS13)

M2S3: ***Presenting positive justification***. The communicative purpose of this step is to introduce the positive reason for carrying out the study being reported. This step is found similarly in Samraj (2002) and Swales (2004) and is utilized to achieve the Move- Creating a niche. Besides, this step should be included in RAs in Dentistry due to the following reasons. Firstly, it clarifies the rationale behind the study being reported, highlighting its significance and potential contributions to the existing background knowledge and patient care in the field of Dentistry. Secondly, positive justification also enhances the scientific credibility of the research by demonstrating that it is based on a solid foundation of existing knowledge and a well-reasoned hypothesis. Thirdly, it ensures the effective use of resources by justifying the study's relevance and importance. Hence, this step strengthens the quality and impact of the research, making it more relevant to the target audience. This step occurred in 14 articles (46.67%) in OMS, so it was an optional step. Excerpt 7 shows an illustration of M2S3.

Excerpt 7:

Digital techniques for evaluating efficacy using computer methods to reconstruct the original CT image data in 3D provides a new method for accurately evaluating cystic lesions postoperatively. (OMS24)

Move 3: ***Introducing the present study***. The communicative purpose of this move is to introduce the research being reported. This move can be realized by 3 steps: M3S1: *Stating purpose(s)*, M3S2: *Presenting hypotheses*, and M3S3: *Introducing equipment/methods*. In this research, this move occurred in 30 articles (100%) in OMS, so it was an obligatory move.

M3S1: ***Stating purpose(s)***. The communicative purpose of this steps is to provide details about the objectives of the study. Most of the articles analyzed provided one aim, but some articles included two or more in their studies. Examples of linguistic clues of this step are "aim, "purpose", "objective", and infinitive verbs indicating the target actions of the research such as "to investigate", "to evaluate, "to perform", and "to provide". This step occurred in 29 articles (96.29%) in OMS, so it was a conventional step in this Dentistry sub-discipline. Excerpt 8 is an illustration of M3S1.

Excerpt 8:

Therefore, this RCT aimed to clinically apply a CS/PVA nanofibrous scaffold into alveolar sockets following tooth extraction and to assess its ability to enhance bone repair by monitoring ridge alterations and bone density at two time points: immediately after tooth extraction (T0) and 4 months later (T4). (OMS25)

M3S2: ***Presenting hypotheses***. The communicative purpose of this step is to provide possible hypotheses or null hypotheses after presenting the aims of the study. This step, which is also accounted for in Swales (2004), was newly added into the current framework. Common linguistic clues in this step are "hypothesize" and "hypothesis". Originally, the step was Presenting RQs or hypotheses in Kanoksilapatham's (2005) framework, but it was then modified by removing RQs to fit the communicative purpose of the step identified in this study. This step occurred in 2 articles (6.67%) in OMS, so it was an optional step in this Dentistry sub-discipline. Excerpt 9 illustrates this step.

Excerpt 9:

We hypothesized that risk analysis would be more effective if the factors related to complications were classified and analyzed. (OMS22)

M3S3: ***Introducing methods/equipment***. The communicative purpose of this step is to present brief information about the methods or equipment utilized in the study being reported. This step is similarly found in Swales (2004) named "*Summarizing methods*". However, in the current study, the step was introduced briefly to name the methods or an equipment, so the step was modified into "*Introducing methods/equipment*" to suit the communicative purpose of this step in the OMS. This step occurred in only 4 articles (13.33%), so it was an optional step in this Dentistry sub-discipline. Excerpt 10 from OMS25 illustrates this step.

Excerpt 10:

Cone-beam computed tomography (CBCT) was used to evaluate the efficacy of the scaffold, which has potential implications for future bone tissue engineering and regenerative applications (Aranaz et al., 2021). (OMS25)

Taken all the findings together, we could propose a framework of the move-step structure of RA Introduction section based on the characteristics of Oral and Maxillofacial Surgery. The proposed framework of moves and steps of OMS RA Introduction sections in Dentistry is presented in Appendix A of the current study.

For Move 1, this move was similarly identified in Swales's (2004) framework, which indicates that OMS RA Introduction sections follow a well-established structure for introducing a research topic, reflecting the influence of Swales's (2004) model on the analysis of rhetorical structure in academic writing. It also implies that the conventions identified in Swales's framework remain relevant in understanding how research articles are structured today.

For M1S1, the occurrence of this step was much lower than in previous studies, accounting for 53.33% in Meng (2021), 86.1% in Gao and Pramoolsook (2023), and 72.5% in Zhao and Pramoolsook (2023). The relatively lower frequency could indicate a shift in focus in the OMS RA Introductions within the specific disciplinary context. It may also reflect a more concise or direct approach in introducing the research, rather than an extensive background description.

For M1S2, the frequency of this step was lower than previous studies with 100% in Meng (2021), 86.1% in Gao and Pramoolsook (2023),

and 100% in Zhao and Pramoolsook (2023). While the frequency in the investigation is not as strikingly lower as M1S1, it still suggests that research gaps or problems may not be as prominently emphasized in OMS as it is in the previous studies. This could reflect a potential shift in the way that authors in a study address the context of their research, perhaps relying on a more implicit framing of the research gap rather than explicitly stating it in this step.

For M1S3, the frequency of this step was also lower than in previous studies with 83.3% in Gao and Pramoolsook (2023), 96.67% in Meng (2021), and 97.5% in Zhao and Pramoolsook (2023). This finding may indicate that the disciplinary conventions or stylistic preferences in OMS RA Introduction sections in this study differ from those in other disciplines, leading to a more implicit or integrated presentation of the research aims.

For Move 2, it was similarly found in the prior research with 83.3% in Gao and Pramoolsook (2023), 66.67% in Meng (2021), 92.5% in Zhao and Pramoolsook (2023). This similartity suggests that Move 2 is a common feature in RAs and occurs across different studies.

For M2S1, it was similarly investigated in previous studies with 13.9% in Gao and Pramoolsook (2023), 56.67% in Meng (2021), and 70% in Zhao and Pramoolsook (2023). This suggests that the research gap might be less explicitly stated or framed in OMS compared to other disciplines, perhaps indicating a more implicit approach in introducing the research gap or a difference in how the gap is conceptualized in this specific disciplinary context. This deviation may reflect changes in scholarly writing practices, where researchers may prefer to situate their work within the existing literature without overtly highlighting a gap, or it could point to differences in how the gap is defined or perceived within the particular focus of the study.

For M2S2, it was originally reported in Samraj (2002, 2005) and also found in previous studies with 13.33% in Meng (2021), and 57.5% in Zhao and Pramoolsook (2023). Its relatively low frequency in the investigation suggests that the authors may have focused more on highlighting the existing literature and less on pointing out its shortcomings or limitations, possibly emphasizing other aspects of the introduction, such as the significance of the study or the methodology. This pattern of showing problems, although lower in frequency, still serves an important function in positioning the research within the broader academic discourse.

Interestingly, M2S3: *Presenting positive justification* was also newly found in the current study. This suggests that the OMS RAs may uncover a fresh, positive rationale or justification that has not been previously emphasized or identified in earlier studies. Moreover, this step emphasizes the novelty and significance of the study being reported.

For Move 3, it was similarly identified in the previous studies with 100% in Meng (2021), Gao and Pramoolsook (2023), and Zhao and Pramoolsook (2023). This suggests that Move 3 is an essential component in the research articles. In Swales's CARS model, Move 3 typically involves outlining the purpose that a study aims to address. This move is crucial for framing the research objectives and setting the stage for the study's contributions, reinforcing its importance in the structure of academic writing.

For M3S1, it was similarly found in the previous studies, but its frequency was higher than the one in previous studies, including 80% in Meng (2021), 77.8% in Gao and Pramoolsook (2023), and 47.5% in Zhao and Pramoolsook (2023). This increase suggests a stronger emphasis on clearly stating the research purpose in the current RA Introduction sections. The prominence of M3S1 could reflect a tendency towards greater clarity and precision in outlining the main research focus or objectives, which might be particularly important for engaging readers from the outset and ensuring they understand the key aims of the study. The difference in frequency compared to Zhao and Pramoolsook (2023), who reported only 47.5%, may also indicate evolving practices in academic writing or differences in disciplinary expectations that influence the visibility and structure of research purpose statements.

Interestingly, M3S2: *Presenting hypotheses* was newly found in the current study. Its presence suggests that in OMS RA Introduction sections, researchers are more inclined to explicitly present their hypotheses, which serves to clearly delineate the anticipated outcomes of the study. This addition could point to a shift in academic conventions where researchers increasingly see the articulation of hypotheses as a necessary component of their introductions, providing a clearer roadmap for the reader. The inclusion of hypotheses also helps to set expectations for the methodology and results sections, aligning the reader with the research design and framework.

For M3S3, it was also similarly reported in the literature, and its status was the same in Gao and Pramoolsook (2023) with 66.7% but different from Zhao and Pramoolsook (2023) with 25%. This step, which outlines the organization of the paper, is essential for guiding the reader through the structure of the article and helping them navigate the forthcoming sections. The high occurrence of M3S3 in the current study and Gao and Pramoolsook (2023) suggests that providing a roadmap for the reader is a common practice in OMS and Electronic Engineering, while the lower frequency in Zhao and Pramoolsook (2023) might reflect a more streamlined or implicit approach to outlining the article's structure in Traditional Chinese Medicine. The variations in M3S3 frequency could indicate differences in how researchers choose to organize their introductions, with some preferring to provide a detailed preview of the paper's structure and others opting for a more concise presentation.

3.2 Results and Discussion of Phrase Frames in OMS RA Introduction Sections

3.2.1 Results and Discussion of Phrase Frames from the Analysis of Structural Category in OMS RA Introduction Sections

Based on the framework of Gray and Biber (2013), the findings from our analysis contain 46 phrase frames, 9 verb-based, 29 other-content-word, and 8 function-word phrase frames appearing in the OMS RA Introduction sections, as presented in Table 5. Previous studies (e.g., Lu et al., 2018; Lu et al., 2021a; Lu et al., 2021b) reported the overall number of phrase frames only, but the current study presented the number of phrase frames and number of their fillers in different types and sub-types of structural categories, which provides

a comprehensive insight about how specific types and sub-types of phrase frames were used in OMS RA Introduction sections. Excerpt 11 presents the structural category of phrase frames.

Table 5. A Summary of Phrase Frames Types in the Structural Category

Categories	Verb-based phrase frames	Other-content-word phrase frames	Function-word phrase frames	Total
Four words	9	29	8	46

Excerpt 11:

Improvement of functions *is one of the* treatment goals of orthognathic surgery. (OMS28)

3.2.1.1 Verb-Based Phrase Frames

For the frequency of this type of phrase frames, a total of 179 occurrences of phrase frames in OMS were reported in 9 phrase frames. Specifically, the phrase frame *was used to* * (49 times) appeared most frequently while the phrase frame *study * to evaluate* (13 times) occurred least frequently in this Dentistry sub-discipline. For the number of fillers of 9 phrase frames, a total of 27 fillers were found in the corpus. There were 7 fillers in the phrase frame *was used to **, and 2 fillers in the phrase frame *study * to evaluate* in this type. Excerpt 12 illustrates this type of phrase frames.

Excerpt 12:

This scan *was used to determine* whether the mandibular cutting guide was positioned according to the virtual surgical plan. (OMS11)

The verb-based category, found in 9 phrase frames, was essential for conveying the action-oriented aspects of OMS RA Introduction sections. Verbs serve as the driving force in articulating the research's purpose, objectives, and specific actions or processes being explored. In the context of RA Introduction sections, these phrase frames are likely used to describe the research aims, methodologies, or activities involved in addressing the research problem. Common verbs in such frames include terms like "investigate", "analyse", "examine" or "evaluate". While verb-based frames are crucial for communicating the direction and intent of the research, their number is relatively small compared to the other types. This indicates that RA Introduction sections often emphasize the presentation of concepts and background over the explicit action or procedures of the study. Nonetheless, the presence of these frames highlights the dynamic nature of academic writing, where the use of verbs helps position the research within a broader academic discourse and provides clarity about its objectives.

3.2.1.2 Other-Content-Word Phrase Frames

In this type, a phrase frame will include one or more nouns, adjectives, adverbs. A total of 570 occurrences of phrase frames in OMS were reported in 29 phrase frames. Specifically, the phrase frame *in the * study* (119 times) appeared most frequently while the phrase frame * *the observation period* (4 times) occurred least frequently in this Dentistry sub-discipline corpus. For the number of fillers of 29 phrase frames, a total of 64 fillers were identified in the corpus. There were 7 fillers in the phrase frame *in the * area*, and 2 fillers in the phrase frame * *one of the* in this type. Excerpt 13 demonstrates this type of phrase frames.

Excerpt 13:

Therefore, *in the current study*, an intraoperative cone beam CT (CBCT) scan was acquired directly after fixation of the cutting guide. (OMS11)

The other-content-word category, found in 29 phrase frames, represented the largest category in the current study. This prevalence underscores the significant role of this type in shaping the structure of OMS RA Introduction sections. These phrase frames typically consist of nouns and adjectives that carry the key concepts, theories, and findings relevant to the research topic. Such phrase frames are crucial for establishing the subject matter, introducing key terms, and framing the research problem in a way that aligns with the scholarly expectations of the discipline. The dominance of this category suggests that OMS RA Introduction sections prioritize the conveyance of substantive information, setting the stage for the research by focusing on the concepts, phenomena, or variables being studied. This trend reflects the need to clearly and precisely outline the research's scope and context in the introductory section of academic writing, where laying a firm foundation of knowledge is essential. These findings confirm the importance of phrase frames in academic English and their variations across different registers and disciplines (Gray & Biber, 2013; Lu et al., 2018; Cortes, 2023; Mathew & Mccallum, 2024).

3.2.1.3 Function-Word Phrase Frames

For the frequency of this type of phrase frames, a total of 365 occurrences of phrase frames in OMS were reported in 8 phrase frames. Specifically, *the * of the* (211 times) appeared most frequently while the phrase frame *with a * of* (9 times) occurred least frequently in this Dentistry sub-discipline. For the number of fillers of 8 phrase frames, a total of 48 fillers were identified in the corpus. There were 26 fillers in the phrase frame *the * of the*, and 2 fillers in the phrase frame *with a * of* in this type. Excerpt 14 demonstrates this type of phrase frames.

Excerpt 14:

The aim of the present study was primarily to determine the proportion of close and involved histological margins in early

stage OTSCC following a change in the surgical margin from 10 mm to 15 mm and to determine any effect of this on the rate of LRF. (OMS17)

The function-word category, found in 8 phrase frames, was the smallest category. It highlights the structural and grammatical components of OMS RA Introduction sections. Function words, such as articles, prepositions, conjunctions, and auxiliary verbs, are integral to sentence structure, providing cohesion and clarity. While their role in OMS RA Introduction sections is less emphasized compared to content-heavy or action-oriented words, they are still essential for ensuring grammatical correctness and readability. Function-word phrase frames are crucial for connecting ideas, introducing relationships between concepts, and organizing the flow of the introduction. However, their relatively low frequency in the investigation suggests that OMS RA Introduction sections place more weight on the delivery of specific information and research objectives rather than the grammatical scaffolding provided by function words. This finding points to a writing style that favors direct, content-driven communication while maintaining necessary syntactic structures for readability and coherence.

3.2.2 Results and Discussion of Phrase Frames from the Analysis of Functional Category in OMS RA Introduction Sections

Based on the framework of Simpson-Vlach and Ellis (2010), we identified 46 phrase frames, including 33 in referential, 5 in stance, and 8 in discourse organizing type, as reported in Table 6. What makes the current findings different from the previous studies (e.g., Lu et al., 2018; Lu et al., 2021a; Lu et al., 2021b) was the exploration in details of different types and sub-types of phrase frames in OMS RA Introduction sections. Excerpt 15 presents an example of phrase frames in the functional category.

Table 6. A Summary of Number of Referential, Stance, and Discourse Organizing Phrase Frames in the Functional Categories

Length	Referential phrase frames	Stance phrase frames	Discourse organizing phrase frames	Total
Four words	33	5	8	46

Excerpt 15:

As a result, the rapidly advancing invasion of SCC *in the parotid gland* can result in high morbidity and mortality. (OMS12)

3.2.2.1 Referential Phrase Frames

In the referential phrase frames, they are classified into 5 sub-types, i.e., specification of attributes, identification and focus, contrast and comparison, deictics and locatives, and vagueness markers. Interestingly, the results revealed that vagueness markers were not found in the current study. For the other types, 8 phrase frames were identified in specification of attributes, 3 in identification and focus, 7 in contrast and comparison, and 15 in deictics and locatives. This category highlights the central role of referential functions in RA Introduction sections, where the primary aim is to establish a clear and coherent discourse about the research topic. The distribution within this category reflects the varied ways in which authors introduce, specify, and frame key concepts and ideas. Referential phrase frames were the most favored in the current study, which was similarly found in the studies of Lu et al. (2018), Lu et al., (2021a), and Lu et al. (2021b). However, the difference of the current study compared to the literature was detailed explorations about sub-types of referential phrase frames since only number of referential phrase frames was reported in previous studies. Excerpt 16 demonstrates an example of referential phrase frame.

Excerpt 16:

The results of the multivariate analysis are presented as the odds ratio (OR) and 95% confidence interval (CI). (OMS18)

In terms of the frequency of specification of attributes, a total of 463 occurrences of phrase frames in OMS were reported in 9 phrase frames. Specifically, *the * of the* (211 times) appeared most frequently while the phrase frame *an increase * the* (5 times) occurred least frequently in this Dentistry sub-discipline. For the number of fillers of 8 phrase frames, a total of 47 fillers were found in the corpus. There were 26 fillers in the phrase frame *the * of the*, and 2 fillers in the phrase frame *an increase * the* in this sub-type. This sub-type involves detailing the characteristics or qualities of specific entities or concepts. This function allows authors to provide precise descriptions and delineate the scope of the research, ensuring that key terms or concepts are well-defined and appropriately contextualized within the academic discourse.

As for the frequency of identification and focus, a total of 20 occurrences of phrase frames in OMS were reported in 2 phrase frames. Specifically, * *with and without* (12 times) appeared more frequently than *have been reported* * (8 times). For the number of fillers of 2 phrase frames, a total of 3 fillers were found in the corpus. There were 3 fillers in the phrase frame *have been reported **, and 2 fillers in the phrase frame * *with and without* in this sub-type. This sub-type focuses on pinpointing specific elements within the research and directing the reader's attention to important concepts, objects, or phenomena. By identifying central aspects of the study, authors help the audience grasp the main points of interest early in the introduction, facilitating a clearer understanding of the research's objectives.

With respect to the frequency of contrast and comparison, a total of 88 occurrences of phrase frames were reported in 7 phrase frames. Specifically, the phrase frame *one of the** (21 times) appeared most frequently while the phrase frame *a high * of* (4 times) occurred least frequently in this Dentistry sub-discipline. For the number of fillers of 7 phrase frames, a total of 14 fillers were found in the corpus. There were 2 fillers in the phrase frames *a higher * of, a * level of, a high * of, one of the *, * one of the, a * risk of,* and * *the risk of* in this sub-type. This sub-type is dedicated to establishing contrasts or drawing comparisons, which is essential for situating the research within the existing body of knowledge. This type of referential function highlights the relationships between previous studies and the new

research, underscoring the unique contributions the current work aims to make. Contrast and comparison are especially vital in establishing the research gap and justifying the need for the study.

Concerning the frequency of deictics and locatives, a total of 261 occurrences of phrase frames in OMS were reported in 15 phrase frames. Specifically, the phrase frame *in the * area* (58 times) appeared most frequently while the phrase frame *bone * in the* (13 times) occurred least frequently in this Dentistry sub-discipline. For the number of fillers of 15 phrase frames, a total of 39 fillers were found in the corpus. There were 7 fillers in the phrase frame *in the * area*, and 2 fillers in the phrase frame *the * third molar* in this sub-type. Deictics and locatives was the largest sub-type within referential phrase frames, with 15 instances, including deictics and locatives. These phrase frames are used to position the research within specific contexts or to point out the relevance of the study in relation to time, space, or context. Deictics refer to words that depend on the context to convey meaning, which are often employed to orient the reader to the research at hand. Locative frames further specify where the research is situated, geographically, contextually, or academically.

3.2.2.2 Stance Phrase Frames

In the stance phrase frames, they are classified into 5 types, i.e., hedges, epistemic, expression of ability and possibility, evaluation, and intention/volition/prediction. Interestingly, the findings reported that only hedges and epistemic were found in the current data, which makes the current study different from prior research (Lu et al., 2018). To be more specific, 2 phrase frames in hedges and 3 in epistemic were found in the study. Excerpt 17 introduces an example of stance phrase frames.

Excerpt 17:

It has been reported that not only tongue size and tongue habits, but also tongue adaptation to changes in intraoral volume after orthognathic surgery, have a significant influence on treatment success (Wickwire et al., 1972). (OMS28)

With reference to the frequency of hedges, a total of 37 occurrences of phrase frames in OMS were reported in 2 phrase frames. Specifically, the phrase frame *has been * to* (22 times) appeared more frequently than phrase frame *it has been* * (15 times) in this Dentistry sub-discipline. For the number of fillers of 2 phrase frames, a total of 5 fillers were identified in the corpus. There were 3 fillers in the phrase frame *was used to* *, and 2 fillers in the phrase frame *it has been* * in this sub-type. This sub-type is used to soften the language, indicating uncertainty or tentativeness. Hedges, such as *may*, *suggest*, or *could* are employed to convey caution and avoid making overly definitive statements. This is particularly important in academic writing, where authors often need to acknowledge the limitations of their research or the provisional nature of their findings.

In terms of the frequency of epistemic, a total of 52 occurrences of phrase frames in OMS were reported in 3 phrase frames. Specifically, *studies have * that* appeared most frequently, with 23 times in this Dentistry sub-discipline. The less frequent phrase frames were *have been * to* with 18 occurrences and *it is * that* with 11 occurrences. For the number of fillers of 3 phrase frames, a total of 8 fillers were found in the corpus. There were 3 fillers in the phrase frame *have been * to* and *studies have * that*, and 2 fillers in the phrase frame *it is * that.* This sub-type is used to express the degree of knowledge or certainty about a given topic. Epistemic phrases help position the research within the broader academic landscape, signaling whether the author believes their findings are well-established or still open to interpretation. Common epistemic markers might include phrases such as *it is * that* or *studies have * that* which indicate the level of certainty or the basis of knowledge upon which the research is grounded.

3.2.2.3 Discourse Organizing Phrase Frames

In this type, there were 8 phrase frames, including 4 in topic elaboration and 4 in discourse markers. No phrase frames were found in metadiscourse and textual reference, and topic introduction and focus. This PF category plays a vital role in structuring the flow of the introduction and guiding the reader through the logical progression of ideas. This category ensures that the introduction is coherent and effectively structured, making it easier for the reader to follow the argument or narrative. Compared to the findings of previous studies (e.g., Lu et al., 2018; Lu et al., 2021a), metadiscourse and topic introduction were not found in OMS RA Introduction sections. Interestingly, details about phrase frames and their fillers in topic elaboration and discourse markers are presented, which makes the current study different from the previous studies. Excerpt 18 is an example of discourse organizing phrase frames.

Excerpt 18:

The cutting guides were designed with an arch *in order to provide* a better fit to the mandible, thereby minimizing the degrees of freedom in placement. (OMS11)

Regarding the frequency of topic elaboration, a total of 147 occurrences of phrase frames in OMS were reported in 6 phrase frames. Specifically, *was used to* * (49 times) appeared most frequently, while the phrase frame *in order to* * (4 times) occurred the least frequently in this Dentistry sub-discipline. For the number of fillers of 6 phrase frames, a total of 19 fillers were identified in the corpus. There were 7 fillers in the phrase frame *was used to **. Only 2 fillers were in the phrase frames *in order to **, *this study * to*, and *study * to evaluate.*

This sub-type functions to expand or clarify the research topic. These frames are essential for providing deeper insights into the research focus, explaining why the topic is important, and offering additional context that enriches the reader's understanding. By elaborating on the topic, authors create a more comprehensive view of the research area, demonstrating its significance and relevance.

Concerning the frequency of discourse markers, a total of 50 occurrences of phrase frames in OMS were reported in 4 phrase frames.

Specifically, the phrase frames *on the * of* appeared most frequently, with 18 times in this Dentistry sub-discipline. The phrase frame * *the treatment of* appeared 14 occurrences. There were 9 occurrences found in the phrase frames *by the * of* and *with a * of*. For the number of fillers of 4 phrase frames, a total of 9 fillers were found in the corpus. There were 3 fillers in the phrase frame *on the * of*. The other 3 phrase frames, which contain 2 fillers in each, were * *the treatment of, by the * of*, and *with a * of* in this Dentistry sub-discipline. This sub-type serves to organize the discourse and signal shifts in the conversation. Discourse markers guide the reader through different sections of the introduction, indicating relationships between ideas, providing structure, and ensuring the text flows smoothly. These markers help maintain clarity and ensure that the reader can easily navigate the argument.

In terms of the results of this section, it showed that phrase frames served as essential tools which make OMS RA Introduction sections both cohesive and persuasive, which is similarly found in Anthropology, Applied Linguistics, Economics, Political Science, Psychology, and Sociology (Lu et al., 2018; Lu et al., 2021a; Lu et al., 2021b). Interestingly, 3 functions of phrase frames were also found from the findings of this research. From these 3 funtions, they confirmed the value of phrase frame list for EDP teaching, learning and research publication.

One of the primary functions of phrase frames in OMS RA Introduction sections is to position the study within the broader academic conversation. Phrase frames such as *the * of the* or *in the * group* are commonly used to reference existing literature and highlight the ongoing academic dialogue about the topic. These phrase frames help the DDS authors position their research in relation to what is already known, thus establishing the foundation upon which their study is built. By signaling familiarity with the field, the DDS authors build credibility and provide a roadmap for how their research will contribute to the broader discourse. Excerpt 19 introduces this view.

Excerpt 19:

The aim of the controlled slow release method that arises at this stage is to ensure that the active substance is present in the environment for as long as possible and to increase its therapeutic effect. (OMS3)

Another critical aspect of OMS RA Introduction sections is the identification of a research gap. Phrase frames such as *studies have * that* or *it is * that* are strategically employed to underline what is known in the field and the areas where further investigation is needed. These frames often introduce a common understanding of the topic, followed by a statement of the limitations or overlooked aspects. By using such frames, the DDS authors justify the research's relevance, showing that the study will contribute to advancing the understanding of the topic. Excerpt 20 introduces this view.

Excerpt 20:

Studies have shown that bone mineral changes under 30% cannot be detected on X-rays; therefore, panoramic radiographs are unable to sensitively reflect tiny changes in the bone mineral composition of cystic lesions. (OMS26)

Finally, phrase frames in OMS RA Introduction sections can be used to highlight the results or potential findings of the study. For example, *a higher * of, a * level of*, or *a high * of* are used to summarize key findings from past research. These phrase frames help to position the study within the current state of knowledge, indicating trends or patterns that the new research will either confirm or build upon. By referencing such findings, OMS RA Introduction sections can suggest that the study will offer more in-depth insights or explore the relationship between variables with greater precision. Excerpt 21 is an example of this view.

Excerpt 21:

For correct indication of the technique and greater planning reliability, up-to-date studies with *a high level of* scientific evidence are needed, which elucidate the success rate and stability in the short, medium, and long term of extra-short implants associated with different types of prosthetic rehabilitation. (OMS8)

3.3 Results and Discussion of Mapping Phrase Frames with the Move-step Structure in OMS RA Introduction Sections

As illustrated in Table 7, frequencies of phrase frames are described with the moves and steps identified in the OMS RA Introduction sections. Overall, phrase frames appeared in all the 3 moves, which was similar findings in the previous studies (Lu et al., 2021a; Lu et al. 2021b). In Move 1, there were 6 phrase frames in M1S1, 16 phrase frames in M1S2, 33 phrase frames in M1S3, and 8 phrase frames in M1S4. Phrase frames appeared most frequently in this move with 50.8%. In Move 2, there were 2 phrase frames in M2S1, 5 phrase frames in M2S2, and 17 phrase frames in M2S3. Phrase frames in this move were found least frequently with 19.35%. In Move 3, there were 28 phrase frames in M3S1, only 1 phrase frame in M3S2, and 8 phrase frames in M3S3. The percentage of phrase frames in this move was 29.84%. Overall, the phrase frames occurred most frequently in Move 1, followed by Move 3 and Move 2, which is similarly reported in Lu et al. (2021a).

Table 7. A Summary of Occurrence of Phrase Frames in OMS RA Introduction Sections

Moves/steps		OMS	
		No. of PFs	%
Move 1: *Announcing the importance of the field*	M1S1: *Claiming the centrality of the topic*	6	4.84
	M1S2: *Making topic generalizations*	16	12.90
	M1S3: *Reviewing previous research*	33	26.61
	M1S4: *Generalizations from previous studies*	9	6.45
Move 2: *Preparing for the present study*	M2S1: *Indicating a gap*	1	1.61
	M2S2: *Showing the problems*	5	4.03
	M2S3: *Presenting positive justification*	17	13.71
Move 3: *Introducing the present study*	M3S1: *Stating purpose(s)*	28	22.58
	M3S2: *Presenting hypotheses*	1	0.81
	M3S3: *Introducing methods/equipment*	8	6.45
Total		124	100

The results of specific phrase frames of OMS RA Introduction sections are presented in Table 8.

Table 8. Mapping Phrase Frames to Move-step Structure in OMS RA Introduction Sections in the Two Sub-disciplines of Dentistry

Moves	Steps	Phrase frames	
		Examples	Fillers
Move 1: *Announcing the importance of the field*	M1S1: *Claiming the centrality of the topic*	in the * of	number
		the number of *	implants
		one of the *	most
		in the * zone	esthetic
		of the * gland	parotid
	Step 2: *Making topic generalizations*	in the * of	number
		the * of the	position
		the * of the	location
		the number of *	implants
		the relationship between *	the
		at the * time	same
		a high * of	level
		one of the *	most
		at the same *	time
		in the * area	esthetic
		for the * of	treatment
		early dental implant *	failure
		* soft tissue recession	midfacial
		* titanium base abutments	the
		the * dental arch	mandibular
		for the * of	treatment
		of the * and	maxilla
	M1S3: *Reviewing previous research*	* of the mandibular	tipping
		have been * to	reported
		* one of the	as
		can be * by	explained
		it has been *	reported
		have been * to	used
		have been * to	reported
		studies have * that	reported
		studies have * that	demonstrated
		been * to be	shown
		been * to be	reported
		the * of the	end
		the use of *	adjunctive
		the * number of	total
		in the * of	treatment
		in the * of	absence
		the * between the	relationship
		a * rate of	recurrence
		one of the *	most
		one of the *	main
		of the * ridge	alveolar
		at the * time	same
		increase the *of	risk
		in the * area	lesion

Moves	Steps	Phrase frames	
		Examples	**Fillers**
		in the * area	esthetic
		of the * bone	buccal
		of the * cavity	oral
		* dental implant failure	early
		and * of the	floor
		that the * of	use
		* soft tissue recession	midfacial
		with a * of	history
		of the * and	mandible
	M1S4: *Generalizations from previous studies*	it has been *	reported
		has been * to	reported
		the * of the	aim
		in the * of	treatment
		in the * gland	parotid
		in the * region	anterior
		in the * gland	parotid
		in the * region	anterior
		of the * and	mandible
	M2S1: *Indicating a gap*	in the * region	anterior
	M2S2: *Showing the problems*	have been * to	reported
		have been * to	reported
		in the * of	number
		a * in the	reduction
		in the * of	number
	M2S3: *Presenting positive justification*	in order to *	provide
		the * of the	stability
		the * of the	reliability
		an * of the	increase
Move 2: *Preparing for the present study*		abutment for the *	prosthesis
		abutment for the *	crown
		titanium base abutment *	for
		at the same *	time
		a * level of	high
		a high * of	level
		of the * cavity	cystic
		of the * cavity	oral
		* titanium base abutment	cylindrical
		of the * cavity	cystic
		abutments for the *	crown
		the titanium base *	abutments
		of the * and	patient
	M3S1: *Stating purpose(s)*	* of the mandibular	tipping
		was to * the	investigate
		was to * the	evaluate
		aimed to * the	evaluate
		aimed to * the	assess
		* to evaluate the	was
		* to evaluate the	aimed
		study was to *	investigate
		study was to *	evaluate
		study was to *	compare
		the aim of *	this
Move 3: *Introducing the present study*		the * of this	purpose
		the * of this	objective
		in the * zone	esthetic
		in the * region	posterior
		in the parotid *	gland
		in the * gland	parotid
		* the observation period	during
		during the * period	observation
		in the * region	posterior
		and * of the	stability
		* soft tissue recession	midfacial
		bone * in the	graft

Moves	Steps	Phrase frames	
		Examples	Fillers
		* of this study	aim
		* of this study	purpose
		* of this study	objective
		study was to *	evaluate
		of the * and	maxilla
	M3S2: *Presenting hypotheses*	the * of the	design
	M3S3: *Introducing the methods*	used to * the	evaluate
		was used to *	evaluate
		was used to *	determine
		was * to determine	used
		* used to determine	was
		this study * to	aimed
		* of the cutting	position
		position of the *	cutting

From the data shown in this section, 3 new findings emerged in terms of the move-step structure and phrase frames in OMS RA Introduction sections.

Firstly, move analysis and phrase frames serve as complementary tools for understanding the structure and language of academic writing, particularly within OMS RA Introduction sections. While move analysis focuses on the broader communicative purposes, such as Move 1: *Announcing the importance of the field*, Move 2: *Preparing for the present study*, or Move 3: *Introducing the present study*, phrase frames provide insights into the specific linguistic patterns used to perform these moves (e.g., Lu et al., 2018; Lu et al., 2021a; Lu et al., 2021b). By examining how these two elements work together, DDS authors can better understand how OMS RA Introduction sections are organized and how they effectively communicate their arguments to their audience. This combined approach enhances our understanding of academic writing by connecting the macro-structure with the micro-level language choices (e.g., Lu et al., 2021a; Lu et al., 2021b; Cortes, 2023; Mathew & Mccallum, 2024; Wu et al., 2024).

Secondly, move analysis categorizes the different rhetorical functions that occur in OMS RA Introduction sections, such as M2S1: *Indicating a gap*, M2S2: *Showing the problems*, M2S3: *Presenting positive justification*. Phrase frames, in contrast, highlight the standardized expressions used to perform these rhetorical functions (e.g. Grabowski, 2015; Lu et al., 2018; Lu et al., 2021a; Lu et al., 2021b; Mathew & Mccallum, 2024; Wu et al., 2024). For example, when stating purpose(s), DDS authors might use phrase frames like *was to * the* (evaluate) or *aimed to * the* (assess). These phrase frames are not random but follow a set of conventions that signal the move's specific purpose. Together, move analysis and phrase frames help DDS authors understand not only what is being conveyed but also how it is conveyed through specific language choices, providing a clearer picture of how scholarly arguments are constructed.

Finally, exploring both move analysis and phrase frames also reveals the influence of discipline-specific conventions on academic writing (e.g. Barabadi et al., 2020; Lu et al., 2021a; Lu et al., 2021b; Appel et al., 2024; Mathew & Mccallum, 2024). Different academic fields often have distinct expectations regarding the organization and language used in OMS RA Introduction sections. For instance, DDS authors may favor both direct and indirect phrase frames like *used to * the* (evaluate) or *was used to* * (determine). By examining the intersection of rhetorical moves and phrase frames, researchers can gain a deeper understanding of how DDS authors in different sub-fields structure their OMS RA Introduction sections and adapt their language to meet the expectations of their disciplinary community. This knowledge can be valuable for scholars seeking to improve their writing by aligning it with discipline-specific norms (e.g., Lu et al., 2021a; Lu et al., 2021b).

4. Conclusion

The current study investigates the move-step structure and phrase frames of English RAs in Oral and Maxillofacial Surgery. The results showed that there were 3 moves and 10 steps that appeared in OMS RA Introduction sections. Besides, there are 46 phrase frames that appeared in the structural and functional categories. From these findings, it can be acknowledged that move analysis and phrase frames are complementary tools that help understand the structure and language of academic writing, especially in OMS RA Introduction sections. While move analysis focuses on rhetorical stages, phrase frames highlight standardized linguistic patterns used to convey these stages, revealing how writers effectively communicate their arguments. Additionally, exploring both tools reveals how discipline-specific conventions influence the organization and language of OMS RA Introduction sections, offering insights into how scholars adapt their writing to meet the expectations of their field.

The findings from this research make a significant contribution to the understanding of move analysis and phrase frames in OMS RA Introduction sections. This study contributes to the understanding of genre-specific academic language in Dentistry, enriching the field of English for Dentistry Purposes, academic writing, and genre analysis, which makes the present research significant and complementary to the previous studies. Secondly, the findings from the present research can be useful for students, language teachers and dentists, to create a course syllabus and develop teaching materials for academic writing courses and for writing RAs in Dentistry. Thirdly, the findings also confirm and extend the success of corpus-based efforts in compiling the list of useful phrase frames in the existing literature (Lu et al., 2018; Cortes, 2023; Wu et al., 2024; Appel et al., 2024; Mathew & Mccallum, 2024). Fourthly, the findings can provide teachers with

structured guidance on how to teach the rhetorical structures and phrase frames commonly used in the English Dentistry RA Introduction sections. Finally, our study can help educators design targeted lessons, writing exercises, and feedback strategies that align with disciplinary writing conventions.

Although valuable findings are in OMS RA Introduction sections, the other sections are still unexplored to provide an insightful guidance of the rhetorical structure and phrase frames of RAs in the field of Dentistry. Besides, the sample size of the current study consists of only 30 RA Introduction sections, which may not represent the whole population. Hence, it is recommended that future research should focus on the investigation of Methods, Results, Discussion and Conclusion section of English RAs in Oral and Maxillofacial Surgery with a larger corpus. Morover, future studies could also explore the interaction between rhetorical structure and visual data (e.g., charts, diagrams) in RA methods and results sections.

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Authors' contribition

Nguyen Huu Chanh was responsible for methodology, data collection and analysis, writing original draft preparation and editing. Issra Pramoolsook was responsible for Conceptualization; methodology, writing original draft preparation, writing review and editing. All authors read and approved the final manuscript.

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Appendix A

Proposed Framework of OMS RA Introduction Section

Move 1: Announcing the importance of the field

Step 1: Claiming the centrality of the topic

Step 2: Making topic generalizations

Step 3: Reviewing previous research

Step 4: Generalizations from previous studies (adopted from Meng, 2016)

Move 2: Preparing for the present study

Step 1: Indicating a gap

Step 2: Showing the problems (adopted from Samraj, 2002)

Step 3: Presenting positive justification (adopted from Swales, 2004)

Move 3: Introducing the present study

Step 1: Stating purpose(s)

Step 2: Presenting hypotheses (adapted from Swales, 2004)

Step 3: Introducing methods/equipment (adapted from Swales, 2004)