

## Importance to include the term Superficial Musculoaponeurotic System in Medical Subject Headings and in the International Anatomical Nomenclature

### A importância da inclusão do termo Sistema Musculoaponeurótico Superficial nos Descritores em Ciências da Saúde e na Terminologia Anatômica Internacional

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#### ABSTRACT

**Purpose:** To investigate the relevance of the term superficial musculoaponeurotic system (SMAS) and demonstrate that this term is important enough to be added to the MeSH database and listed in International Anatomical Nomenclature. **Methods:** Terms related to SMAS were selected from original articles retrieved from the ISI Web of Science and MEDLINE (PubMed) databases. Groups of terms were created to define a search strategy with high-sensitivity and restricted to scientific periodicals devoted to plastic surgery. This study included articles between January 1996 and May 2009, whose titles, abstracts, and keywords were searched for SMAS-related terms and all occurrences were recorded. **Results:** A total of 126 original articles were retrieved from the main periodicals related to plastic surgery in the referred databases. Of these articles, 51.6% had SMAS-related terms in the abstract only, and 25.4% had SMAS-related terms in both the title and abstract. The term 'superficial musculoaponeurotic system' was present as a keyword in 19.8% of the articles. The most frequent terms were 'SMAS' (71.4%) and superficial musculoaponeurotic system (62.7%). **Conclusion:** The term SMAS refers to a structure relevant enough to start a discussion about indexing it as a keyword and as an official term in Terminologia Anatomica: International Anatomical Terminology.

**Key words:** Medical Subject Headings. Terminology. Surgery, Plastic. Abstracting and Indexing as Topic. Anatomy.

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#### RESUMO

**Objetivo:** Investigar a relevância do termo sistema musculoaponeurótico superficial (SMAS) para propor a sua indicação para indexação como palavra-chave e inclusão na Terminologia Anatômica Internacional. **Métodos:** Termos relacionados ao SMAS foram recuperados de artigos originais identificados por mapeamento automático nas bases ISI Web Of Science e MEDLINE (PubMed). Os termos foram agrupados a fim de formar uma estratégia de busca de alta sensibilidade, limitada a periódicos exclusivos da especialidade de Cirurgia Plástica. Destes periódicos, foram selecionados artigos publicados de janeiro de 1996 a maio de 2009. Avaliou-se o título, resumo e as palavras-chaves, computando-se todas as ocorrências de termos relacionadas ao SMAS. **Resultados:** Recuperou-se um total de 126 artigos originais de periódicos relevantes, especializados em cirurgia plástica, e indexados nas bases mencionadas. Destes artigos, 51,6% apresentavam termos relacionados com SMAS somente no resumo, e 25,4% apresentavam termos relacionados com SMAS no título e resumo. O termo sistema musculoaponeurótico superficial estava presente como descritor em 19,8% dos artigos. As ocorrências mais frequentes foram SMAS (71,4%) e sistema musculoaponeurótico superficial (62,7%). **Conclusão:** O termo SMAS, referente à estrutura em estudo, apresentou relevância suficiente para ser indexado como palavra-chave e listado na Terminologia Anatômica Internacional.

**Descritores:** Descritor em Ciências da Saúde. Terminologia. Cirurgia Plástica. Terminologia. Resumos e Indexação como Assunto. Anatomia.

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## **Introduction**

The superficial musculoaponeurotic system (SMAS), an important structure in rhytidoplasty and a term commonly used in the literature, is neither listed in Terminologia Anatomica: International Anatomical Terminology, nor in classical anatomical treatises, even though Mitz and Peyronie had described SMAS as a 'new' anatomical structure in 1976<sup>1</sup>. Consequently, the SMAS is referred in the literature just as a surgical structure, and is not included in the Medical Subject Headings (MeSH) of the Index Medicus database (<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=mesh>).

The retrieval of articles from MEDLINE via PubMed ([http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.section.pubmedhelp.Other\\_Services\\_Inclu#pubmedhelp.Searching\\_by\\_subject](http://www.ncbi.nlm.nih.gov/books/bv.fcgi?rid=helppubmed.section.pubmedhelp.Other_Services_Inclu#pubmedhelp.Searching_by_subject)) is essentially performed by searching for keywords (MeSH terms) in the titles and abstracts of articles. Therefore, a search strategy was designed to identify articles on SMAS using search terms followed by field tags, such as 'All Fields [ALL]' and 'Text Word [TW]'.

However, we found that the term SMAS was listed as a keyword in articles from periodicals indexed in the ISI Web of Knowledge (<http://apps.isiknowledge.com/>) and MEDLINE databases. This may bias the search in databases, because it can induce the researcher to formulate an erroneous search strategy using the term SMAS as a keyword.

According to the International Committee of Medical Journal Editors (Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication, available at <http://www.icmje.org/>), it is mandatory for periodicals including keywords after the abstract to use only terms listed in the MeSH database (MeSH terms) as keywords. On the other hand, publications on the SMAS have gradually become more prominent in the specialized literature, which clearly indicates the need of using the term SMAS as a keyword.

Similarly, this reasoning could also be applied to the international anatomical terminology. Therefore, the objective of this study was to investigate the relevance of the term 'superficial musculoaponeurotic system' and to demonstrate that this term is important enough to be added to the MeSH database and listed in Terminologia Anatomica: International Anatomical Terminology.

## **Methods**

A literature search was conducted on electronic databases for original articles published between January 1, 1996 and May

25, 2009. Articles were retrieved from the ISI Web of Knowledge and MEDLINE/PubMed databases using a search strategy denominated 'Strategy-1', consisting of 'plastic AND (Superficial musculoaponeurotic system OR Superficial musculo-aponeurotic system OR SMAS)'.

All terms and expressions related to or used as synonyms of 'superficial musculoaponeurotic system', 'superficial musculo-aponeurotic system' or 'SMAS' in the title or abstract of the retrieved articles were recorded and denominated as 'Type-1 words'. Compound expressions relating the term 'superficial musculoaponeurotic system' to other terms describing anatomical structures or surgical procedures were also denominated as "Type-1 words", as well as expressions conceptualizing topographically the superficial musculoaponeurotic system. The 'Type-1 words' comprised the following terms: SMAS, Superficial musculoaponeurotic system, Superficial musculo-aponeurotic system, SMAS plication, SMAS flap, SMAS-flap, SMAS-platysma flap, Sub-SMAS, SMAS-platysma, Platysma-SMAS, Complex SMAS-platysma, SMAS rhytidectomy, Maxi-SMAS, SMAS sling, Superficial fascia rhytidectomy, Fascial plane system, Superficial-plane rhytidectomy, Superficial musculoaponeurotic system-platysma, Subcutaneous musculoaponeurotic system, and Submucosal aponeurotic system.

All 'Type-1 words' were grouped and used in a more sensitive search strategy denominated as 'Strategy-2' consisting of '(SMAS OR Superficial musculoaponeurotic system OR Superficial musculo-aponeurotic system OR SMAS plication OR SMAS flap OR SMAS-flap OR sub-SMAS OR SMAS-platysma OR Platysma-SMAS OR Complex SMAS-platysma OR SMAS rhytidectomy OR maxi-SMAS OR SMAS sling OR Superficial fascia rhytidectomy OR Fascial plane system OR superficial-plane rhytidectomy OR Superficial musculoaponeurotic system-platysma)'.

Periodicals on plastic surgery indexed in both the ISI Web of Knowledge and MEDLINE/PubMed were selected. Articles not related to facial surgery were excluded from the sample.

All occurrences of 'Type-1 words' and other SMAS-related terms and expressions identified in titles and abstracts and, occasionally, as keywords (terms incorrectly used as keywords since they are not MeSH terms) were added to a list denominated as 'Type-2 words'. All identical 'Type-2 words' (i.e., having exactly the same spelling) were counted only once in the title, abstract or keywords, regardless of the number of occurrences in an article. The word 'SMAS' was counted regardless of whether it appeared as a term (i.e., without a previous description of the acronym) or as an acronym after the full term. In order to count 'Type-2 words',

only original articles retrieved using ‘Strategy-2’ were considered; all other types of publications were excluded.

**Results**

Thirty-seven citations were retrieved from the periodical Aesthetic Plastic Surgery (APS), 4 from the British Journal of Plastic Surgery (BJPS), 92 from the Plastic and Reconstructive Surgery (PRS), 10 from the Annals of Plastic Surgery (AnPS), 10 from the Clinics in Plastic Surgery (CPS), and 5 from the Journal of Plastic, Reconstructive & Aesthetic Surgery (JPRAS). JPRAS is the new title of BJPS since January 2006. The total number of citations retrieved was 158. During the search, 22 citations not

related to the topic were excluded, as follows: 2 from the APS, 11 from the PRS, 4 from the AnPS, 3 from the CPS, and 2 from the JPRAS. Therefore, a total of 136 citations remained in the sample at this point.

With regard to the type of publication, 34 original articles and 1 ‘letter to the editor’ were retrieved from the APS; 4 original articles from the BJPS; 72 original articles, 4 ‘letters to the editor’, 2 ‘viewpoints’, 1 biography, 1 ‘Ideas and Innovations’ and 1 ‘Video Bonus’ from the PRS; 6 original articles from the AnPS; 7 original articles from the CPS; and 3 original articles from the JPRAS. A total of 126 original articles were selected; the ‘Type-2 words’ found in these articles are shown in Table 1.

**TABLE 1** – Number of ‘Type-2 words’ per periodical. SMAS-related terms (Type-2 words) identified in the title, abstract and keywords of original articles.

TERMS	APS <sup>a</sup>	AnPS <sup>b</sup>	BJPS <sup>c</sup>	JPRAS <sup>d</sup>	PRS <sup>e</sup>	CPS <sup>f</sup>	TOTAL
SMAS	39	4	1	3	36	7	90
Superficial musculoaponeurotic system	21	3	1	2	50	2	79
Superficial musculo-aponeurotic system	1	0	1	0	0	0	2
SMAS plication	4	0	0	0	2	0	6
SMAS flap	6	1	0	1	3	0	11
SMAS-flap	1	0	0	0	0	0	1
Sub-SMAS	1	2	1	0	4	0	8
SMAS-platysma	4	0	1	0	3	0	8
Platysma-SMAS	1	0	0	1	0	0	2
Complex SMAS-platysma	0	0	0	0	1	0	1
SMAS rhytidectomy	0	2	0	0	1	0	3
maxi-SMAS	0	0	0	0	8	0	8
Superficial musculoaponeurotic system-platysma	0	0	0	0	4	0	4
Superficial muscular aponeurotic system	2	0	0	0	0	0	2
Sub-superficial musculo aponeurotic system	1	0	0	0	0	0	1
SMASectomy	3	0	0	0	7	2	12
SMAS-platysma musculoaponeurotic system	1	0	0	0	0	0	1
Nasal SMAS	1	0	0	0	0	0	1
Nasal superficial musculoaponeurotic system	1	0	0	0	0	0	1
Trifurcated SMAS flap	1	0	0	0	0	0	1
Suprazygomatic SMAS	1	0	0	0	0	0	1
High-superficial musculoaponeurotic system	0	0	0	0	1	0	1
High-SMAS	0	0	0	0	1	1	2
Subcutaneous musculoaponeurotic system	1	0	0	0	0	0	1
Submucosal aponeurotic system	1	0	0	0	0	0	1
SMAS-platysma flap	0	0	0	0	1	0	1

<sup>a</sup> Aesthetic Plastic Surgery; <sup>b</sup> Annals of Plastic Surgery; <sup>c</sup> British Journal of Plastic Surgery; <sup>d</sup> Journal of Plastic, Reconstructive & Aesthetic Surgery; <sup>e</sup> Plastic and Reconstructive Surgery; <sup>f</sup> Clinics in Plastic Surgery.

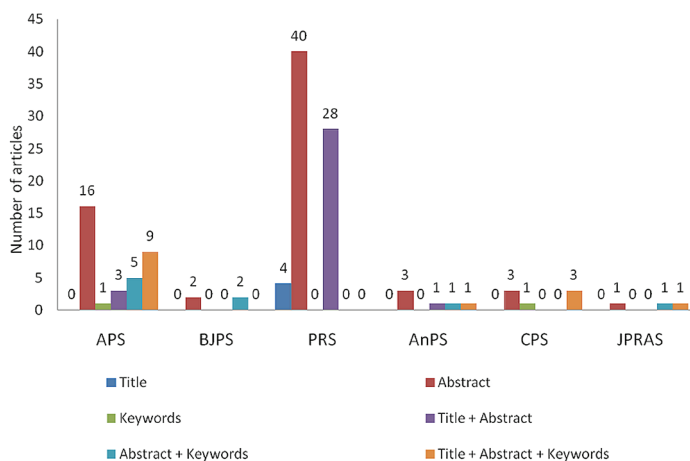
In some of the retrieved articles, 'Type-2 words' occurred exclusively in the title or abstract or as a keyword, but there were articles in which "Type-2 words" occurred simultaneously in the 'title and abstract' or 'abstract and keywords' or 'title, abstract and keywords' of the same article. Table 2 and Figure 1 show the number of original articles retrieved per periodical, stratified by the presence of 'Type-2 words' in their titles, abstracts and keywords.

Of the 126 retrieved articles, 51.6% had 'Type-2 words' in the abstract only, and 25.4% had 'Type-2 words' simultaneously in the title and abstract. The most cited term was 'SMAS' (71.4%) followed by 'Superficial musculoaponeurotic system' (62.7%), 'SMASectomy' (9.52%), and 'SMAS flap' (8.73%), see Figure 2.

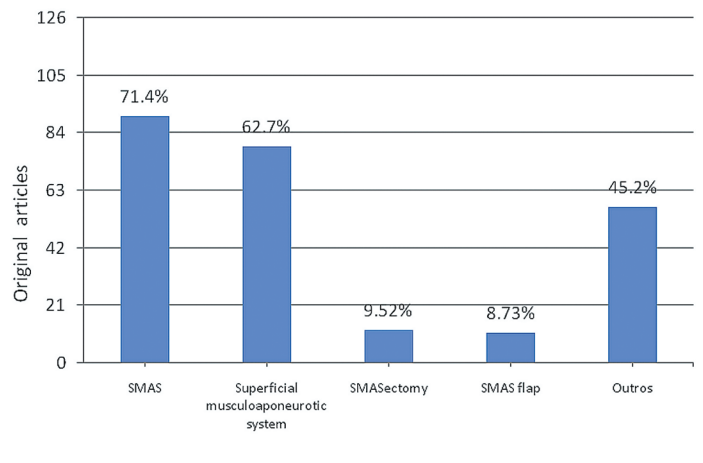
**TABLE 2** - Number of original articles retrieved per periodical, stratified by the presence of SMAS-related terms (Type-2 words) in their titles, abstracts and keywords.

OCCURENCES OF TERMS	APS <sup>a</sup>	AnPS <sup>b</sup>	BJPS <sup>c</sup>	JPRAS <sup>d</sup>	PRS <sup>e</sup>	CPS <sup>f</sup>	TOTAL	
							n	(%)
<b>Exclusive occurrences (n)</b>								
Title only	0	0	0	0	4	0	4	(3.2%)
Abstract only	16	3	2	1	40	3	65	(51.6%)
Keywords only	1	0	0	0	0	1	2	(1.6%)
<b>Simultaneous occurrences (n)</b>								
Title and Abstract	3	1	0	0	28	0	32	(25.4%)
Abstract and Keywords	5	1	2	1	0	0	9	(7.1%)
Title, Abstract and Keywords	9	1	0	1	0	3	14	(11.1%)
<b>TOTAL</b>	<b>34</b>	<b>6</b>	<b>4</b>	<b>3</b>	<b>72</b>	<b>7</b>	<b>126</b>	<b>(100%)</b>

<sup>a</sup>Aesthetic Plastic Surgery; <sup>b</sup>Annals of Plastic Surgery; <sup>c</sup>British Journal of Plastic Surgery; <sup>d</sup>Journal of Plastic, Reconstructive & Aesthetic Surgery; <sup>e</sup>Plastic and Reconstructive Surgery; <sup>f</sup>Clinics in Plastic Surgery.



**FIGURE 1** – Number of original articles retrieved per journal, stratified by the presence of terms or expressions related to the SMAS in their titles, abstracts and keywords.



**FIGURE 2** – Percentage of terms or expressions related to SMAS most commonly found in original articles.

## Discussion

Even though the importance given to the SMAS by researchers and plastic surgeons has increased<sup>2-4</sup>, this structure is still neither a MeSH term nor recognized by anatomists.

It is known that all research is based on solid scientific evidences and that, for the identification of evidences, it is necessary to carry out searches in databases. The search strategy using electronic means is essentially based on keywords, which basically group articles about a given topic, facilitating their identification.

A search strategy was designed to search for terms in articles published from January 1996 to May 2009. The search extended back to the second half of the 1990's because this represents a relatively short period of time in which the term SMAS has been well known by surgeons and commonly used in the medical literature. The search strategy was developed using several steps with the objective to increase its sensitivity to the detriment of specificity. That is the only way to retrieve all information available on a non-indexed term using the 'automatic term mapping' feature in PubMed.

The search was conducted for articles published in the following periodicals: APS, BJPS, PRS, AnPS, CPS, and JPRAS, which are specialized in Plastic Surgery and indexed in both the ISI Web of Knowledge and MEDLINE/PubMed databases.

Only original articles were considered in the counting of 'Type-2 words' since they have a conventional format (with title, abstract, and keywords) common to all periodicals included in the study, except for the PRS, which does not require keywords. Other types of publication, which were not common to all periodicals, were excluded.

A total of 126 original articles were retrieved; 51.6% of

these articles had 'Type-2 words' in the abstract only, and 25.4% had 'Type-2 words' simultaneously in the title and abstract. The remaining articles had the presence of 'Type-2 words' in a smaller percentage either exclusively or simultaneously in the title, abstract and/or keywords.

In the light of these results, the fact that the term 'SMAS' is still not a MeSH term leads, in practical terms, to a systematic bias in the retrieval of information regarding this anatomical structure, compromising the efficiency of searches related to facial surgery.

According to the Brazilian Society of Plastic Surgery (Datafolha statistics 2009), rhytidoplasty comprised about 7% of all aesthetic surgeries performed in Brazil in 2008 and, according to the American Society of Plastic Surgeons (2010 Report of the 2009 Statistics, available at <http://www.plasticsurgery.org/Documents/Media/statistics/2009-US-cosmeticeconstructiveplasticsurgeryminimally-invasive-statistics.pdf>) rhytidoplasty is the sixth most common aesthetic surgery in the United States, where more than 103000 procedures were performed in 2009<sup>5</sup>. In almost all of these procedures, there is a surgical approach to the SMAS. Therefore, the knowledge to carry out this approach in a safe and efficient manner is extremely important and should be easily and clearly available in databases and in Terminologia Anatomica. Only advances in the understanding of human morphology can provide the basis for the evolution of medical and biological sciences in general.

Although the term 'superficial musculoaponeurotic system' is not listed in PubMed (it is not a MeSH term), it is interesting to note that 19.8% of SMAS-related terms were present in the keywords, as exclusive or simultaneous occurrences, and that they were used as keywords at the initiative of the authors themselves; it is not clear, though, whether permission was granted by the scientific periodicals or whether the reviewers did not pay attention to this particular requirement. It is important to note that the same search strategy was used to identify articles on SMAS in anatomy periodicals indexed in the ISI Web of Knowledge and MEDLINE databases, but no SMAS-related articles were found.

The term 'SMAS' (the acronym) was the most prevalent (71.4%) term followed by 'superficial musculoaponeurotic system' (62.7%); therefore, the full, self-descriptive term is recommended as a MeSH term, and 'SMAS', as the acronym.

On the other hand, not adopting SMAS as an anatomical structure may compromise the knowledge of facial anatomy in a surgical context<sup>6-11</sup>, since this is an individualized structure, even though it is not listed in Anatomical Nomenclature<sup>12</sup>. This type of situation demonstrates that more effective communication

and integration among anatomists, surgeons, and librarians are necessary to assure the inclusion and proper indexing of this term in databases and information centers.

## Conclusion

The term 'superficial musculoaponeurotic system' and the acronym 'SMAS' are relevant enough to be added to the Mesh database; moreover, their indexing in databases and inclusion in Terminologia Anatomica: International Anatomical Terminology are fully justifiable.

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