

# Dental sleep medicine education among undergraduate dental students in France

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## KEYWORDS

dental sleep medicine, dental schools, education, obstructive sleep apnoea, sleep disorders, students

# Abstract

## Introduction:

Dental sleep medicine (DSM) is an emerging discipline that studies the oral and maxillofacial causes and consequences of sleep-related problems. DSM is of utmost importance given the major medical challenge it represents. Therefore, to verify whether the future generation of dentists would be ready to face this challenge, the main objective of this study was to assess the degree of involvement of the French dental schools in teaching DSM at the undergraduate level.

## Materials and Methods:

All 16 dental schools in France were asked to participate in the study by answering to an online survey concerning the DSM curriculum during the 2018–2019 academic year. The survey was addressed to the head of the dental school and/or to relevant course coordinators and contained 10 questions related to the type, content and amount of DSM teaching to undergraduate dental students.

## Results:

Nine of the 16 (56.2%) French dental schools responded to the questionnaire. All these nine reported the inclusion of DSM in their undergraduate curriculum. The total average hours dedicated to teaching DSM was 5.6 h (SD 4.2; range 1–15 h). Seven of the 9 dental schools spent most of their DSM curriculum teaching time in the fifth year. All of them reviewed obstructive sleep apnoea and sleep-related bruxism and covered some topics related to therapies for sleep-related breathing disorders, such as the use of oral appliance.

## Conclusion:

The results of this survey showed that, although the average hourly volume is relatively high, the DSM teaching in French dental schools appeared to be non-standardised, heterogeneous and often lacunar. It is therefore essential to develop a common curriculum and implement it in all dental schools to provide undergraduate students a comprehensive and updated teaching in DSM.

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## 1 | INTRODUCTION

Sleep is a state of physical and psychic quiescence that plays an intrinsic part in many behavioural and physiological functions, including development, cognition, vigilance, energy conservation, brain waste clearance, modulation of immune responses, disease and psychological state.<sup>1</sup> Under certain circumstances, some sleep disorders can significantly impair these essential functions, resulting in serious consequences on the patient's health and quality of life, as well as in significant socio-economic costs.<sup>2,3</sup> It is therefore essential for health professionals to be trained in the prevention, screening, diagnosis and management of

certain sleep disorders. This is the case for dentists who see a large proportion of the population in everyday practice and who are likely to encounter many of the so-called dental sleep disorders.<sup>4</sup> These conditions include sleep-related oro-facial pain, sleep-related breathing disorders (SRBDs), such as snoring and obstructive sleep apnoea (OSA), oral moistening disorders (i.e., oral dryness and hypersalivation), mandibular movement disorders (orofacial dyskinesia, oromandibular dystonia and sleep-related bruxism–SB) and gastro-oesophageal reflux disorder (GERD).<sup>4–6</sup>

All these sleep-related conditions are studied by an emerging, cross-cutting and fast-growing discipline, viz. dental sleep medicine (DSM). Since its early introduction more than 20 years ago by Pr G.J. Lavigne and coworkers,<sup>7</sup> DSM has concerned the study of the oral and maxillofacial causes and consequences of sleep-related problems.<sup>8,9</sup> Given the major medical challenge represented by the management of these sleep disorders, it seems essential not only to offer a specifically targeted postdoctoral education to practicing dentists but also to teach DSM to undergraduate students during their study curriculum at the university dental schools/faculty of dentistry.<sup>10–12</sup> To verify whether the next generation of dentists would be ready to face the major medical challenge represented by the screening and management of certain sleep disorders, the present study aimed to assess the degree of involvement of French dental schools in teaching DSM during the cursus of undergraduate studies.

## 2 | METHODS

The present study involved the 16 university-based dental schools in France, who were asked to answer to a survey to gather information regarding the DSM curriculum for the 2018–2019 academic year. The survey consisted in an electronic questionnaire (Google Forms®) emailed to the deans of each institution. We first sent the survey to all French dental schools on the 5 September 2018; a second email was sent to those schools that had not responded on the 12 September 2018. Deans were asked to answer directly or to forward to the appropriate faculty member(s) the questionnaire in order to have detailed data about DSM teaching (Appendix S1). Data processing was anonymized before statistical analyses, and it was made clear to each participant that they were free to answer to the questionnaire, or not. In order to compare results, the questionnaire was structured by selecting items used in previous studies conducted in dental schools in the US,<sup>13</sup> Australia and New Zealand,<sup>14</sup> and Middle East.<sup>15</sup> The main seven categories included (1) numbers of hours spent teaching DSM, (2) number of hours of DSM education from the third to the sixth year of study (3), department(s) involved in DSM teaching, (4) topics covered, (5) therapies for SRBD discussed, (6) hours spent teaching oral appliance therapy (OAT); and (8) willingness to develop DSM education in the future. Results were tabulated and rechecked on a MS Excel spreadsheet prior to final analyses.

FIGURE 1 Total teaching hours at each of the nine responding dental schools that engage in teaching dental sleep medicine in France.

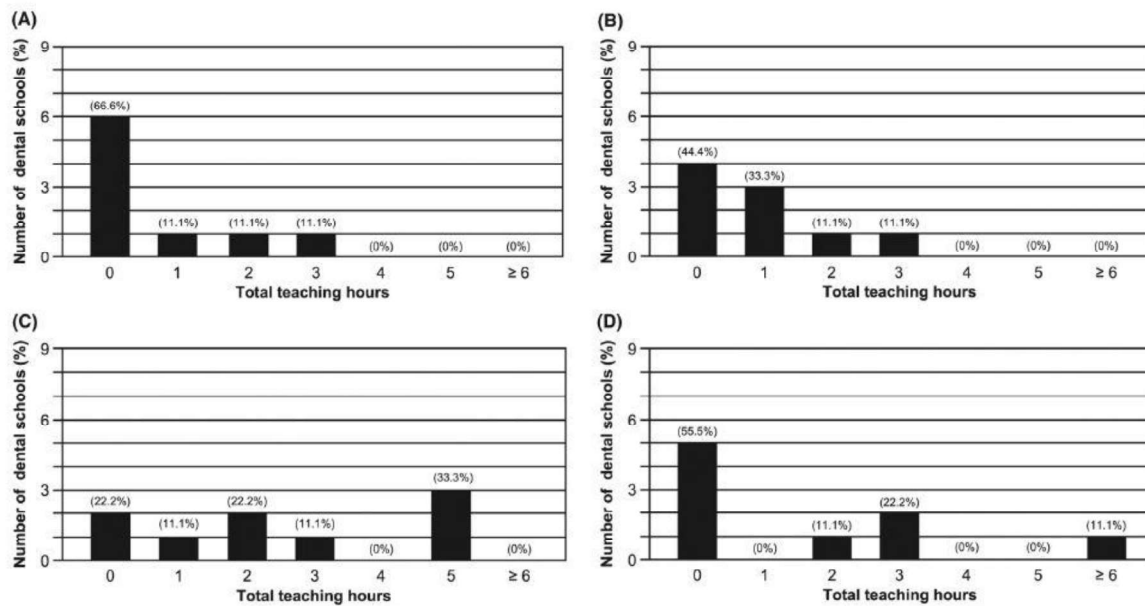
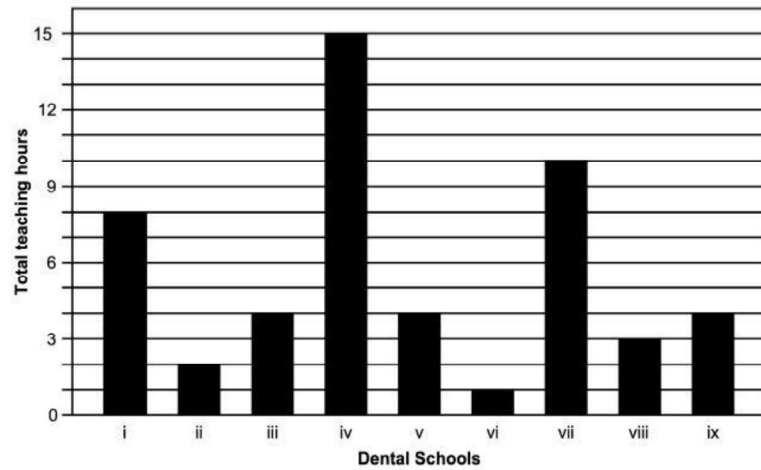


FIGURE 2 Distribution of total teaching hours in dental sleep medicine for each undergraduate academic year. (A) 3rd year. (B) 4th year. (C) 5th year. (D) 6th year.

### 3 | RESULTS

Nine of the 16 French dental schools (56.2%) responded to the survey. Out of the responding schools, 100% (9/9) reported the inclusion of DSM in their undergraduate curriculum, and their results, classified in seven main categories, were analysed.

1. The average total undergraduate teaching of DSM time was 5.6 h (SD: 4.2), ranging from 1 to 15 h (Figure 1). The mode value was 4 h by 3 schools.

2. Three dental schools teach DSM in the 3rd year with a corresponding mean of 0.6 h, five in the 4th year with a corresponding mean of 0.8 h, seven in the 5th year with a corresponding mean of 2.5 h and four in the 6th year with a corresponding mean of 1.5 h (Figure 2A–D). This means that the DSM curriculum is taught in different years in some dental schools (e.g.,

2 h in 3rd year, 3 h in 4th year, 5 h in 5<sup>th</sup> year and 5 h in 6th year for the dental school # iv), with most of them teaching DSM in the 5th year of dentistry.

3. Regarding the departments involved in teaching DSM, it concerned only one department for 77.7% of the responding dental schools and two departments in the remaining 22.2%. The Temporomandibular disorders/Orofacial pain (TMD/OFP) department (66.6%) was the most frequently involved, followed by the Orthodontic department (33.3%), then the others in equal measure (11.1%) (i.e., Oral surgery, Prosthodontics, Periodontics and Pedodontics) (Figure 3). More specifically, in the two dental schools where DSM was taught by more than one department, the departments involved are TMD/OFP pain and Orthodontics (school # v) and TMD/OFP and Pedodontics (school # ix).

4. The topics taught varied among the dental schools. The most frequently treated DSM subjects included OSA and SB (100%), followed in equal measure (11.1%) by insomnia, parasomnia and restless leg syndrome (Figure 4). Only one dental school (# i) reported to teach other sleep disorders (i.e., circadian rhythm disorders).

5. Regarding the therapies for SRBD, the results show that they are numerous and varied (Figure 5). All dental schools involved in DSM teaching covered the topic of OAT. Eight of the nine responding dental schools (88.8%) have some time dedicated to continuous positive airway pressure (CPAP), oral and maxillofacial surgery, as well as orthodontics therapies for OSA. Similarly, seven of the responding dental schools reported to discuss ENT surgical therapies and six of them also positional treatment for SRBD. Among other therapies, hypoglossal nerve stimulation therapy was reported by three dental schools (i.e., # i, # iv and # vii).

6. As far as the teaching of OAT is concerned, all responding dental schools reported to teach it (Figure 6). Five of them (55.5%) dedicate 1 h on this topic, three (33.3%) 1.5 h and another one (11.1%) at least 3 hours per year.

7. Finally, eight of the nine dental schools (88.8%) reported that they wished to develop the DSM teaching in the future, whereas only one (i.e., # iii) declared not to wish to change the volume of teaching hours.

#### 4 | DISCUSSION

The present study assessed the degree of involvement of French dental schools in teaching DSM during the 2018–2019 academic year. Although DSM is a recognized discipline in the field of odontology, dental surgery and sleep medicine, with dedicated scientific journals and national/international scientific societies, DSM teaching at the undergraduate level has received very little attention in the literature. To our knowledge, this is the first study reporting data about DSM teaching in a European country.

Nine of the 16 university-based dental school in France responded to the survey and provided data about their engagement in teaching DSM, with an average of 5.6 total hours of teaching during the undergraduate curriculum of studies. This is higher than the average amount of hours reported in previous studies, corresponding to 4.5, 3.9, and 1.2 h in Australian and New Zealand (6/6 responding dental schools),<sup>14</sup> in the US (49/56 responding dental schools),<sup>13</sup> and the Middle East (39/51 responding dental schools),<sup>15</sup> respectively. This is also higher

than the average amount of time (2.5 h) spent on sleep education among medical schools in different countries.<sup>16,17</sup>

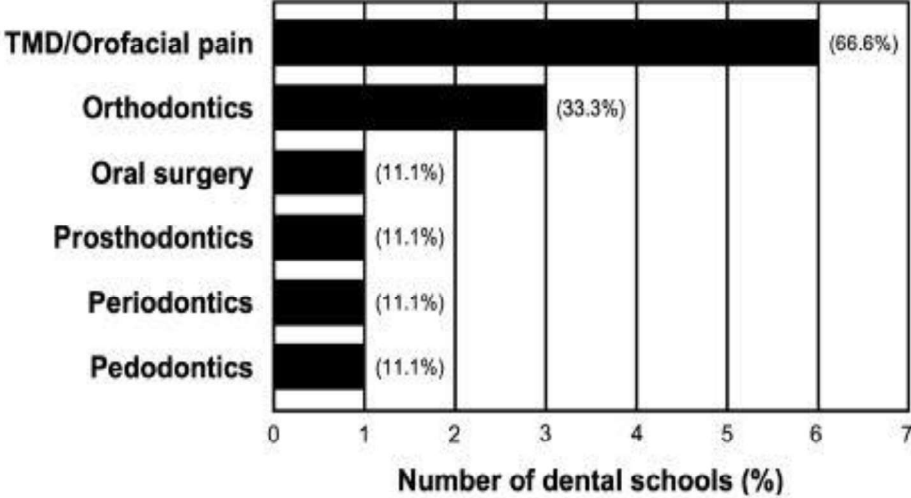


FIGURE 3 Departments teaching dental sleep medicine in undergraduate dental curriculum.

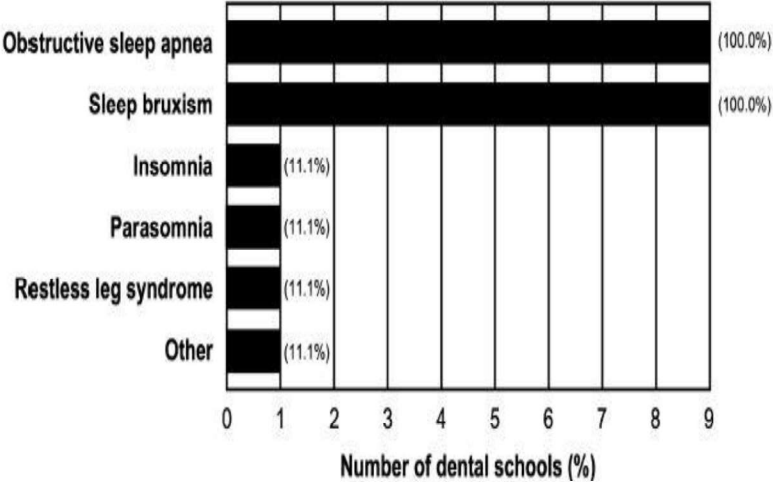


FIGURE 4 Dental sleep medicine topics discussed in undergraduate dental curriculum.

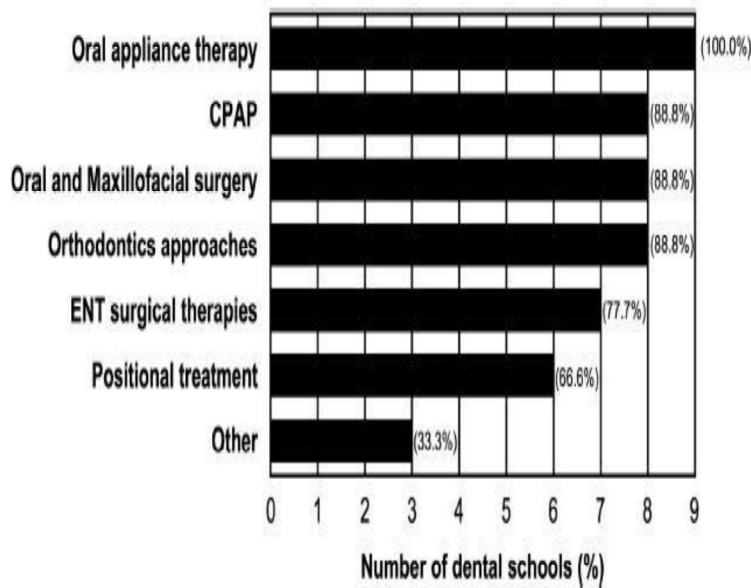


FIGURE 5 Sleep disordered breathing therapies discussed at dental school.

These results, which concern French dental schools, seem good at the first sight, but further description and analysis of the undergraduate DSM teaching curriculum disclose a significant heterogeneity in the number of teaching hours, which vary between 1 and 15 h, and in the covered topics. Moreover, we must acknowledge that there was a high rate of non-response to the questionnaire among the French dental schools (43.8%). This is higher compared to dental schools in the US (non-response rate of 12.5%),<sup>13</sup> Australia and New Zealand (14.3%),<sup>14</sup> and Middle East (24.0%),<sup>15</sup> introducing a potential selection bias. Indeed, it could be supposed that the non-responding dental schools were not involved in DSM teaching and thus felt to be non-concerned in replying to the survey.

Notwithstanding these limitations, the current study gives us interesting and useful information about DSM teaching in France. This discipline appeared to be taught predominantly (45%) during the fifth year of dentistry (2.5 h on average for all dental schools), which is typically a clinically oriented year. These results are consistent with those found in other dental schools in Australia and New Zealand,<sup>14</sup> whereas the highest average time spent on DSM education (1.8 h) was found during the third year in US dental schools,<sup>13</sup> and during the 4th year in Middle East dental schools.<sup>15</sup> Here again, in France as in other evaluated countries,<sup>13–15</sup> a considerable heterogeneity was found among dental schools with DSM courses spanned from the 3rd to the 6th year.

Regarding the university departments that usually teach DSM, the present study showed that the TMD/OFP department is the one most frequently involved, but that also other departments can have a role in DSM teaching. Interestingly, this discipline may be taught by two different departments in the same dental school, highlighting its transversal features, coving from pathophysiology to treatment. Our survey did not explore how different departments coordinate and communicate regarding the topics to cover, the teaching methods, learning objectives or purposes. This was also a concern in the US,<sup>13</sup> Australia and New Zealand,<sup>14</sup> as well as the Middle East<sup>15</sup> dental schools teaching DSM.



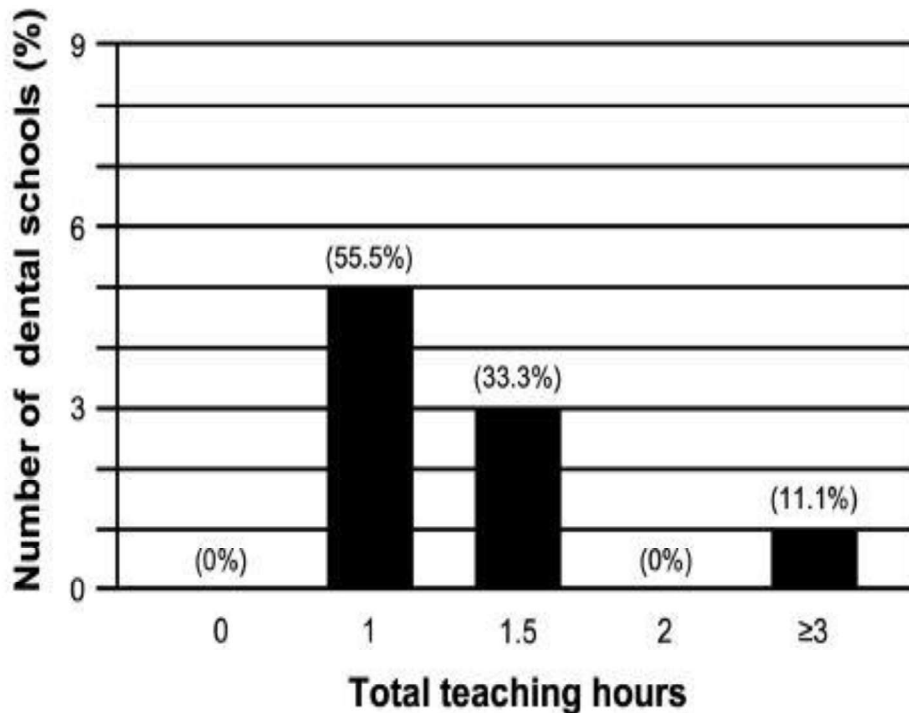


FIGURE 6 Total hours spent teaching oral appliance therapy.

The present result also showed that all French dental schools mentioned or covered SRBD and SB. This is an interesting result especially when considering OSA, which is a medical condition that if left untreated can lead to severe consequences to the patients' health, safety and quality of life. Surprisingly, only 11% discussed insomnia, which remains one of the most common sleep disorders and which is frequently comorbid with chronic orofacial pain, including painful TMDs.<sup>18–20</sup> In addition, teaching more advanced DSM topics such as oral moistening disorders (oral dryness and hypersalivation), mandibular movement disorders (orofacial dyskinesias and oromandibular dystonias) and GERD, which are part of the so-called dental sleep disorders, were rarely or not at all covered in the dental schools, highlighting the lacunar nature of the current undergraduate education in DSM.

While all dental schools discussed the two most common therapies for SRBD, namely CPAP and OAT, other therapies including oral, maxillofacial or ENT surgical therapies as well as orthodontics approaches were not universally covered in the curriculum. Similar lacunar education was noted in the US,<sup>13</sup> Australia and New Zealand,<sup>14</sup> and in the Middle East,<sup>15</sup> dental schools of the previous publications.

Although treated in all dental schools, the amount of time generally allocated to teaching OAT (1 h) seems to be insufficient to cover all necessary aspects of this important treatment for snoring and OSA (e.g., indications, classification, mechanisms of action, evidence for use, management, potential side effects and complications).<sup>21</sup> Moreover, this should include a specific volume of hours dedicated to hands-on training, which is rarely considered.



More generally, the results of this study show that the teaching of DSM in France, as in other countries, is heterogeneous at different levels, viz. amount of teaching time, years covered by this teaching, university departments involved, and topics covers and discussed. It also appeared to be lacunar by disregarding some aspects of DSM that may have a great clinical impact.

Given the high and increasing prevalence of (dental) sleep disorders and their impact on individual patients and society, we strongly support DSM education starting from the undergraduate curriculum.<sup>4,6,10–12,22–24</sup> All general dentists, together with other dental professionals such as dental hygienists,<sup>25</sup> and dental nurses,<sup>4</sup> should be competent in preventing, recognizing and managing dental sleep disorders. To achieve this objective, it is necessary to develop collaborative and standardized curricula, which certainly concern OSA, but they should also include the other dental sleep disorders so intensely interrelated with one another.<sup>4</sup> The list of topics to be included and covered in DSM education and training recently proposed by Herrero-Babiloni et al.<sup>11</sup> seems to be a very good starting point for this purpose.

The present study has several limitations, but it is the first one to describe DSM teaching in France. To obtain a more extensive picture of DSM teaching and training, the same survey should be addressed to all dental schools in Europe, the starting point to develop a common undergraduate curriculum. To enhance the response rate, further reminders should have been sent by email after the electronic questionnaire was sent, and eventually a paper version of the questionnaire could have been implemented and sent to the deans of the dental schools.

Finally, it should be noted that at the date this paper was written, the supervisory authorities responsible for the development of French university education had not created or implemented foundational protocols for DSM. Therefore, the decision to incorporate this type of education in dental schools depended mainly on the deans and their boards, which since 2007 and the autonomy movement of French universities have had wider responsibilities and competences.

## **5 | CONCLUSION**

Dentists, among oral health care professionals, have a major role in preventing, screening, diagnosing and managing dental sleep disorders. Therefore, it is essential to give attention and allocate time for teaching DSM during the undergraduate curriculum of dental students. The results of the survey conducted in French dental schools show that even though the average hourly volume is greater than in other countries, the teaching appears heterogeneous and often lacunar. The low response rate to the questionnaire could also be interpreted as an absence of teaching in a significant number of schools. Taken together, these results support the cardinal importance to give more attention and allocate more time for teaching DSM in the dental school in France. The willingness to develop and implement a standardized curriculum for DSM teaching and training was reported by almost all of French dental schools who answered to the survey, and it is an encouraging sign for the future.

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## CONFLICT OF INTEREST STATEMENT

The authors have no conflicts of interest to disclose.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are openly available in [Médecine Dentaire du Sommeil] at [<https://www.dropbox.com/scl/fi/3pj1u7fgx44zrlk w5jq57/MDS.xlsx?dl=0&rlkey=lwop4m4qgfi044a nd88qrlady>].

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