Mucosal Melanoma In Situ of the Oral Cavity: A Case Report and Systematic Review of the Literature

Introduction

Pigmented lesions of the upper aerodigestive tract often require tissue biopsy to determine if they represent the highly malignant mucosal melanoma. Malignant mucosal melanomas of the head and neck are rare and represent only 1%, of all melanomas; and among these, the most common locations include the
Mucosal melanoma in situ (OMMIS) is a rare condition that typically arises in the oral cavity, nasal cavity, the paranasal sinuses, and the oral cavity. The prognosis for mucosal melanoma of the head and neck is poor, with only a 5-year survival rate of 25–30%, and it is commonly associated with local recurrence as well as distant metastasis. A contributing factor to this poor prognosis is the concealed locations in which these tumors arise, which make them less likely to be discovered during routine screenings. Because of this characteristic, these lesions are usually not found until late in the disease course. Oral mucosal melanoma in situ (OMMIS) has rarely been reported, and its actual prevalence is therefore unknown.

Mucosal melanoma of the oral cavity has unique characteristics that differentiate it from cutaneous melanoma, but pigmented changes of the oral cavity mucosa is the usual presenting finding. While melanoma in situ is considered a precursor to cutaneous melanoma, mucosal melanomas are not proven to have precursor non-invasive lesions. Oral mucosal melanoma generally is diagnosed at a later age than cutaneous melanoma with most cases occurring between ages 50 and 80, with a median age of 70 years. Due to the lack of exposure of the oral cavity and other mucosal regions to light, it is unlikely that UV light plays a role in the development of these lesions. Additionally, these cancers show unique genetic profiles, with BRAF mutations occurring far less frequently in mucosal melanomas relative to cutaneous melanomas. Furthermore, mucosal melanomas show an increased incidence in KIT mutations, occurring in an estimated 39% of these cancers. A slightly increased risk in the Japanese population suggests a possible correlation with either hereditary or environmental factors. However, the etiology and pathogenesis of mucosal melanoma still remain largely unknown.

Oral mucosal melanomas arise from the malignant transformation of melanocytes. This can occur in the cells found either in the basal layer of the oral epithelium or less commonly in the lamina propria of the oral mucosa. Among mucosal melanomas of the oral cavity, an exceedingly small percentage are identified as mucosal melanoma in situ. These lesions are identified histologically by a radial proliferation of malignant melanocytes along the basal cell layer, which lack invasion through the basement membrane into the lamina propria.

Herein, we report a rare case of OMMIS that was evaluated and diagnosed by the patient’s dentist and biopsied by her oral and maxillofacial surgeon. The pathology was reviewed and confirmed by an oral pathologist. Furthermore, we conducted a systematic literature review of the documented cases of oral melanoma in situ to further characterize this rare disease and compile diagnosis, treatment, and outcome details to aid in future early diagnosis and management of these lesions.

Case Report

A 45-year-old female was referred for evaluation of a pigmented lesion in the left floor of mouth and the lateral border of the tongue, which was discovered during a routine dental examination (Figure 1). The lesion appeared to grow quickly over the course of two months. The patient reported no history of smoking or other tobacco use and no prior cutaneous or other malignancies or premalignancies. She endorsed current alcohol use of two standard drinks per week. Past medical history and surgical history were noncontributory. Family history was significant for cutaneous melanoma in her maternal aunt. A computed tomography of the oral cavity, neck and chest was performed, showing no signs of other neoplastic signs or disease spread. The patient denied any noticeable symptoms, pain, bleeding, dysgeusia, dysarthria, dysphagia, or lymphadenopathy.

A biopsy was performed, showing an increased number of melanocytes irregularly distributed along the basal epithelial layer (Figure 2). These melanocytes exhibited a nested arrangement. Cells demonstrating nuclear atypia were also observed. Histopathologic examination determined to be consistent with mucosal melanoma in situ.

The patient was evaluated at the multidisciplinary head and neck clinic and the tumor board recommended surgical resection not only to remove the lesion but also to confirm that there were no evidence of invasive malignant melanoma that might require new staging. The initial plan was for complete resection, consisting of a 5-mm margin clearance of visible tumor and to delay reconstruction until definitive pathologic interpretation was completed. Further resection and/or reconstruction would be completed upon confirmation of final pathology clearance. Thus, left partial glossectomy, gingivectomy and floor or mouth resection was performed and the tumor oriented and mapped for the oral and head and neck pathology team. Upon resection, the lesion was found to involve the left floor of the mouth, the

Figure 1. Clinical presentation of lesion on left side of the floor of the mouth prior to surgical resection.
Wharton’s duct, the ventrolateral tongue, and the lingual mandibular gingiva. A xeroform iodoform petrolatum gauze was placed as a temporary bolster to prevent scarring and tethering and to allow for orientation and resection if any of the margins were close or involved. The final pathology returned as melanoma in situ measuring 2.2x2x1.4 cm with the closest margin near the gingival edge anteriorly and at the retromolar region.

Thus, reconstruction was planned with a resection of the retromolar gingiva and the anterior gingival margin, which was determined to be free of pigmented lesion, followed by the reconstruction of the oral cavity, the floor of mouth, and the tongue with local mucosal advancement flaps, allograft, Wharton’s duct sialodochoplasty, and bolster placement.

The patient is currently twelve months status post-resection, with no signs of disease (Figure 3). Speech, healing, and swallowing have returned to baseline and examination showed scarring but no return of pigmented lesions. The current plan is to continue follow-up with oral cancer examination and surveillance for five years to rule out signs of disease recurrence.

Methods

Search Criteria

A systematic review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (6). The following databases were searched: PubMed (National Library of Medicine, National Institutes of Health), Scopus (Elsevier), and CINAHL (EBSCOHost). These databases were searched from inception through January 26, 2022. Search terms were developed by two trained researchers (W.N.J. and N.S.P.) to include themes related to oral mucosal melanoma pertaining to the head and neck region. Furthermore, the databases were manually searched to include any manuscripts which were not captured by the initial search. Full strategy details are included in Appendix 1.

Selection Criteria

All report types were considered for inclusion. Studies were only included if 1) described oral cavity melanoma in situ, and 2) documented specific data pertaining to treatment modality, outcomes, lesion site, etc. Exclusion criteria were studies which did not stratify data on oral mucosal melanoma from other cancers, did not provide any follow-up or outcomes data, or studies reporting oral invasive melanoma with no reporting or cases of melanoma in situ. Exclusion criteria also included non-English studies and studies with no reported DOI.

Data Extraction

All reports from the initial search strategy were imported into the Covidence software (Veritas Health Innovation, Melbourne, Australia). Title and abstract screening and subsequent full text review was conducted independently by two of the authors (W.N.J. and N.S.P.). The data was then extracted and organized into a standardized Excel spreadsheet. Author, patient age and sex, lesion site and size, modality of treatment, and follow-up/outcomes were recorded as available.

Level of Evidence and Quality Assessment

The levels of evidence for the included reports were evaluated according to the Oxford Center for Evidence-Based Medicine (7). The Joanna Briggs Institute (JBI) critical appraisal checklist was used to assess the quality of Case Reports (8 questions) and Case Series (10 questions) (8). Two authors (W.N.J. and N.S.P) reviewed all included studies independently and rated each checklist item as “yes,” “no,”
In case of any disagreements, a third reviewer assisted with the appraisal by discussion of the study quality to reach a consensus. The JBI scores assigned to each reviewed report ranged from 0, if none of the criteria were met, to 8 for Case Reports and 10 for Case Series, if all criteria were met. Then the sum of individual questions represented the overall quality of a study. The risk for bias was then assigned based on number of items scored “yes.” Studies were then rated as low risk or of good quality when they scored 4 or above and were therefore included in the analysis (8).

Statistical Analysis

Summary statistics were calculated with frequency and percentage for categorical variable (gender) and mean for continuous variable (age).

Results

In total, 19 manuscripts met full inclusion criteria, presenting data on 28 patients diagnosed with melanoma in situ of the oral cavity. Figure 4 details the entire search process. The details, including patient information, description of the lesion, treatment, and outcome regarding these cases can be found in Table 1. These lesions were most common in males representing 18 (64.29%) of the cases. While the entire group age ranged from 16 to 78 years, the average age at presentation was found as 57.35 years. The majority of these cases presented as asymptomatic pigmented lesions, and many were discovered during routine dental examination. Per the Oxford Level of Evidence stratification, all studies were deemed to be Level 4. All 19 reports in Tables 2 and 3 were found to have a low risk of publication bias.

The most common location for the lesions was the palate, which was found in 13 of the reported cases (46.42%). The gingiva was also found to be commonly affected, with involvement in five of the reported cases (17.86%). Our patient presented with a lesion centered in the floor of the mouth, a case which has not been reported to date. Per the Oxford Level of Evidence stratification, all studies were deemed to be Level 4. All 19 reports in Tables 2 and 3 were found to have a low risk of publication bias.

The majority of these lesions were treated with surgical excision, with only three of them receiving adjuvant therapy. Radiotherapy was used in one case for a 2x1.5 cm lesion that had recurred twice following surgical resection with 0.5 mm margins. Following this treatment, no further recurrence was noted after two years of surveillance. Chemotherapy was noted to have been used in two cases. The first case was administered cisplatin and thiosulfate prior to the original surgical resection, and interferon alpha 2b following surgery. The lesion recurred locally twice and following failure to achieve negative margins in the final resection, topical imiquimod was administered for six months and no further recurrence was noted. In the second case, a chemotherapy regimen of cisplatin, vinblastin, and dacarbazine was used following the discovery of spread to the cervical lymph nodes after the original surgical resection. Follow-up for this case was not reported. In the cases in which recurrence was found, the time between initial treatment and recurrence varied widely from 1 month to 84 months.

Discussion

Oral pigmented lesions that are unrelated to hereditary or amalgam related etiologies should undergo biopsy. A biopsy showing OMMIS should prompt a multidisciplinary evaluation and oral pathology review to confirm the absence of invasion. Surgical resection is indicated for treatment and to confirm adjacent sites are not invasive mucosal melanoma. Oral mucosal melanoma and OMMIS most
| Authors                        | OLE | Age, years | Sex | Site                        | Lesion size          | Surgical treatment                                                                 | Margins    | Adjuvant therapy? | Outcome                                      | Time to first recurrence, months | Follow-up, months |
|-------------------------------|-----|------------|-----|-----------------------------|----------------------|-------------------------------------------------------------------------------------|------------|-------------------|---------------------------------------------|----------------------------------|------------------|
| Becker et al. (15)            | 4   | 46         | M   | Hard palate                 | 2 cm x 1.5 cm        | Surgical excision (extraction of teeth 12, 11, 21)                                  | 0.5 mm     | Radiotherapy       | Multiple recurrences                        | 3                                | 24               |
| Breik et al. (16)             | 4   | 57         | M   | Right buccal mucosa         | 16 mm                | Right BM-WLE, SND, and flap reconstruction                                           | >10 mm     |                   | No evidence of disease                       |                                  |                  |
|                              |     |            |     | Right side of hard palate  | 14 mm                | Right subtotal maxillectomy, ITF clearance, right SND, ALT free flap reconstruction   | >10 mm     |                   | No evidence of disease                       |                                  |                  |
| Carbone et al. (17)           | 4   | 77         | M   | Gingiva                     | NA                   | Hemimaxillectomy                                                                     | 5 mm       |                   | No evidence of disease                       |                                  | 71               |
| Cardoso et al. (18)           | 4   | 67         | M   | Maxillary alveolar mucosa   | 3 cm x 1.5 cm        | Partial maxillectomy                                                                | NA         |                   | No evidence of disease                       |                                  | 10               |
| Hajar-Serviansky et al. (19)  | 4   | 40         | M   | Lower right half of lip     | 1.5 cm x 4 cm        | Surgical excision and reconstruction                                               | NA         |                   | NA                                          | NA                               | NA               |
| Horisch et al. (20)           | 4   | 66         | F   | Internal cheek, vermilion   | NA                   | NA                                                                                  | NA         |                   | NA                                          | NA                               | NA               |
| Kemp et al. (21)              | 4   | 74         | M   | Maxillary ridge, palate,    | NA                   | Surgical excision; recurrence treated w/ additional surgical excision               | NA         |                   | Local recurrence                            | 25                               | 38               |
| Kuk et al. (22) (6 cases)     | 4   | <58        | M (3), F (3)                | Maxilla (5), Lip (1) | Surgical excision                                                                   | >5 mm (4), <5 mm (2) | NA         | NA                                          | NA                               | NA               |
| Lourenço et al. (23)          | 4   | 75         | M   | Hard palate                 | NA                   | None                                                                                | NA         |                   | No evidence of disease                       |                                  | NA               |
| Luna-Ortiz et al. (24)        | 4   | 47         | F   | Gingiva, palate             | NA                   | Resection of the lesion; extraction from 11 to 16                                   | 2 mm       |                   | No evidence of disease                       |                                  | 24               |
|                              |     |            |     | Hard/soft palate, gingiva   | NA                   | Wide excision of the palate and gingival lesion                                     | 1.5 mm     |                   | No evidence of disease                       |                                  | 8                |
| Magliocca et al. (25)         | 4   | 48         | M   | Mid-anterior hard palate    | 3 cm x 2 cm          | Wide local excision; additional surgery to pre-maxilla (extractions of teeth #6-13) | 0.5 cm     |                   | No evidence of disease                       |                                  | 42               |
| Park et al. (14)              | 4   | 72         | M   | Upper lip, inner labial     | 5.3 cm x 4.7 cm      | Surgical excision                                                                   | 5 mm       | chemotherapy       | Recurrence; locoregional recurrence (cervical lymph nodes) | 1                                | 2                |
| Prasad et al. (12)            | 4   | NA         | NA  | NA                          | NA                   | Definitive surgery                                                                  | NA         |                   | Recurrence; distant metastases              | NA                               | NA               |
commonly presents asymptomatically as an irregularly shaped, pigmented, single or multifocal lesion (9). This lesion can appear plaque-like, nodular, or macular. Other possible symptoms include pain, bleeding, ulceration, and difficulty wearing dentures due to the tumor (9). Because early lesions are not normally noticed by patients, they tend to present later in the disease course. Because the appearance of mucosal melanoma can mimic that of benign pigmented or inflammatory lesions, as well as other malignant lesions, it is imperative that a biopsy be performed to rule out melanoma for any suspicious lesion of the oral cavity (10).

The Breslow criteria that are used to assess cutaneous melanoma are less useful in assessing mucosal melanoma due to the lack of a granular layer in many mucosal sites (9). Staging of primary mucosal melanomas of the head and neck primarily utilizes a simplified staging system for primary mucosal melanomas of the head and neck that was developed by Ballantyne in 1970. This system designates three stages: stage I for localized lesions, stage II for spread to regional lymph nodes, and stage III for distant metastasis (11). A more specific microstaging system is also available for further describing stage I disease, developed by Prasad et al. (12) in 2004. This system designates three levels: level I for noninvasive, in situ lesions, level II for superficially invasive disease, and level III for deep invasion into muscle, bone, or cartilage (12). The 7th edition of the American Joint Committee on Cancer Staging Manual included an additional chapter regarding the staging of mucosal melanomas, identifying all mucosal melanomas limited to the mucosa as T3 due to their aggressive nature but does not report on OMMIS. Advanced mucosal melanomas are identified as either T4a or T4b. However, due to the limited number of cases of mucosal melanoma in situ, staging of these lesions was not addressed (11).

| Author(s)       | Year | Age | Gender | Location            | Size             | Treatment                                                   | Recurrence | Follow-up |
|-----------------|------|-----|--------|---------------------|------------------|-------------------------------------------------------------|------------|-----------|
| Tremblay et al. | 2016 | 16  | M      | Left posterolateral  | 4 mm             | Full excisional biopsy                                       | NA         | NA        |
| Sedassari et al.| 2017 | 51  | F      | Mandibular gingiva  | NA               | Surgical excision                                           | NA         | No evidence of disease |
| Shastri et al.  | 2018 | 49  | M      | Hard palate         | 3 cm x 2.5 cm    | Local mucosal surgical excision; recurrences treated w/ additional 10 incision and excisional biopsies over following 10 years | NA         | Multiple recurrences |
|                |      |     |        |                     |                  | Local mucosal surgical excision; recurrence treated w/ additional wide local excision down to the bone |             | Local recurrence |
|                |      | 78  | M      | Hard palate         | 7 mm             | Local mucosal surgical excision                              | NA         | 1         |
|                |      |     |        |                     |                  | Local recurrence |
|                |      | 57  | F      | Hard palate         | 3 cm x 2 cm      | Local mucosal surgical excision                              | NA         | 84        |
|                |      |     |        |                     |                  | Local recurrence |
|                |      |     |        |                     |                  | Partial maxillectomy; two recurrences treated with second partial maxillectomy, multiple gingivectomies & mucosectomies | NA         | 5         |
| Spieth et al.  | 2019 | 67  | M      | Left side of hard palate | NA              | Partial maxillectomy; two recurrences treated with second partial maxillectomy, multiple gingivectomies & mucosectomies | NA         | Local recurrence post original surgery/chemo; no evidence of disease post-surgery/imiquimod |
| Wu et al. (29) | 2020 | NA  | NA     | Left floor of mouth | 2.2x2x1.4 cm     | Partial glossectomy/FOM resection                            | NA         | 60        |
| Presented case | 2021 | 45  | F      | Left floor of mouth | 2.2x2x1.4 cm     | Partial glossectomy/FOM resection                            | No evidence of disease | 12 (ongoing) |

Total cases: 29

OLE: Oxford Level of Evidence, cm: Centimeter/s, mm: Millimeter/s, F: Female, M: Male, NA: Not available
In general, because of the potential for rapid progression of these lesions, mucosal melanoma in situ is treated similar to invasive melanoma, with surgical excision (9). For most of the reported cases, treatment consisted of surgical excision, which usually resulted in full remission with no recurrence. In one case, however, surgical excision was supplemented with chemotherapy including cisplatin, thiosulfate, and interferon alpha-2b, but a local gingival recurrence was identified five months post-surgery. Surgical excision was performed again, this time supplemented with topical imiquimod, and resulted in full remission with no recurrence (13). Similarly, in another case, after recurrence and cervical lymph node enlargement was noted, surgical excision was supplemented with a multi-chemotherapy agent, consisting of cisplatin, vinblastine, and dacarbazine, and, at 2-month follow-up, no signs of disease were noted (14). More data are needed to determine if adjuvant radiation therapy or chemotherapy offers any additional protection from recurrence. Finally, the emerging role of immunotherapy in many cancers and cutaneous melanoma may warrant evaluation in mucosal melanoma and melanoma in situ.

Limitations of this study included the retrospective nature of the analysis and lack of independent oral pathologic review to confirm the in situ nature of these pigmented diagnoses. Additionally, true surgical margin analysis and adjuvant decision making were not reported. For the presented case, surgical excision alone has been effective thus far, with no signs of recurrence at twelve months of follow-up. Given the high rate of recurrence for mucosal melanoma and limited data on OMMIS, long-term follow-up is important.

Conclusion

In this study, we reviewed 28 previously reported cases of OMMIS, as well as one case from our own institution which is the first known case of mucosal melanoma in situ of the floor of mouth. The majority of the reported malignancies were diagnosed during a routine dental visit based on visible pigmented changes and treated effectively with complete surgical resection alone. However, long term follow-up is essential given the potential risk of recurrence demonstrated in the cases presented in this review. The role of adjuvant therapy cannot be determined based on this limited data, but further studies may be useful to investigate the indications for and the role in lowering the risk of recurrence.

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Authorship Contributions

Surgical and Medical Practices: PJ, W.N.J., N.S.P., S.A.N., J.H., B.W.N., T.A.D., Concept: PJ, W.N.J., N.S.P., S.A.N., J.H., B.W.N., T.A.D., Design: PJ, W.N.J., N.S.P., S.A.N., T.A.D., Data Collection and/or Processing: PJ, W.N.J., N.S.P., Analysis and/or Interpretation: PJ, W.N.J., N.S.P., S.A.N., J.H., B.W.N., T.A.D., Literature Search: PJ, W.N.J., N.S.P., Writing: PJ, W.N.J., N.S.P., S.A.N., J.H., B.W.N., T.A.D.

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| Table 2. JBI critical appraisal checklist for case reports |
|----------------------------------------------------------|
| Study                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Total scores |
|------------------------|---|---|---|---|---|---|---|---|--------------|
| Becker et al. (15)     | Y | Y | Y | Y | Y | Y | Y | Y | 8             |
| Breck et al. (16)      | U | Y | N | Y | Y | Y | Y | Y | 6             |
| Carbone et al. (17)    | Y | Y | Y | Y | Y | U | Y | Y | 7             |
| Cardoso et al. (18)    | Y | Y | Y | Y | Y | Y | Y | Y | 8             |
| Hajar-Serviansky et al. | Y | Y | Y | Y | Y | U | Y | Y | 6             |
| Horuchi et al. (20)    | Y | Y | Y | Y | N | N | N | N | 4             |
| Kemp et al. (21)       | Y | Y | Y | Y | Y | Y | Y | Y | 8             |
| Lourenco et al. (23)   | Y | N | Y | Y | N | N | N | N | 4             |
| Luna-Oritz et al. (24) | Y | Y | Y | Y | Y | Y | Y | Y | 8             |
| Magliocca et al. (25)  | Y | Y | Y | Y | Y | Y | Y | Y | 8             |
| Park et al. (14)       | Y | Y | Y | Y | Y | N | Y | Y | 7             |
| Prasad et al. (12)     | Y | Y | Y | U | U | N | N | 4             |
| Tremblay et al. (26)   | Y | Y | Y | Y | N | N | Y | 6             |
| Sedassari et al. (27)  | Y | Y | U | Y | Y | U | Y | Y | 6             |
| Shastri et al. (28)    | Y | Y | Y | Y | Y | Y | Y | N | 7             |
| Smith et al. (10)      | Y | Y | Y | Y | N | N | N | N | 4             |
| Spieth et al. (13)     | Y | Y | Y | Y | Y | Y | Y | Y | 8             |

Y: Yes, N: No, U: Unclear, JBI: Joanna Briggs Institute, 1. Were patient’s demographic characteristics clearly described? 2. Was the patient’s history clearly described and presented as a timeline? 3. Was the current clinical condition of the patient on presentation clearly described? 4. Were diagnostic tests or assessment methods and the results clearly described? 5. Was the intervention(s) or treatment procedure(s) clearly described? 6. Was the post-intervention clinical condition clearly described? 7. Were adverse events (harm) or unanticipated events identified and described? 8. Does the case report provide takeaway lessons?

| Table 3. JBI critical appraisal checklist for case series |
|--------------------------------------------------------|
| Study                  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total scores |
|------------------------|---|---|---|---|---|---|---|---|---|----|--------------|
| Kuk et al. (22)        | Y | Y | Y | Y | Y | Y | Y | Y | Y | 10 |              |
| Wu et al. (29)         | Y | Y | Y | Y | Y | Y | Y | Y | Y | 8  |              |

Y: Yes, N: No, 1. Were there clear criteria for inclusion in the case series? 2. Was the condition measured in a standard, reliable way for all participants included in the case series? 3. Were valid methods used for identification of the condition for all participants included in the case series? 4. Did the case series have consecutive inclusion of participants? 5. Did the case series have complete inclusion of participants? 6. Was there clear reporting of demographics of the participants in the study? 7. Were there clear reporting of clinical information of the participants? 8. Were the outcomes or follow-up results of cases clearly reported? 9. Was there clear reporting of the presenting site(s)/clinic(s) demographic information? 10. Was statistical analysis appropriate?
Main Points

• Men comprised the majority (64.3%) of the cases, and the average age at presentation was 57.4 years.

• Hard palate was the most common location.

• Out of 28 cases reported in the literature, eight reported no evidence of disease after a minimum of six-month follow-up, one reported spread to the cervical lymph nodes, and only one reported progression with distant metastasis.

• The role of adjuvant therapy needs to be further researched to define its role in reducing recurrence.

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Appendix 1. Search Strategy

**PUBMED:** “Mucosal melanoma” AND (“in situ” OR Oral OR “Oral Cavity” OR “Tongue” OR “oropharynx” OR “pharynx” OR Tonsil OR Pillar OR “Buccal Mucosa” OR “Head and neck” OR “Head & neck”)

Search date: 1.26.2022

Results: 551

**SCOPUS:** TITLE-ABS-KEY (“Mucosal melanoma” AND (“in situ” OR oral OR “Oral Cavity” OR “Tongue” OR “oropharynx” OR “pharynx” OR tonsil OR pillar OR “Buccal Mucosa” OR “Head and neck” OR “Head & neck”) AND (LIMIT-TO (LANGUAGE, “English”) AND (LIMIT-TO ( SRCTYPE, “j”))))

Search date: 1.26.2022

Results: 600

**CINAHL:** “Mucosal melanoma” AND (“in situ” OR Oral OR “Oral Cavity” OR “Tongue” OR “oropharynx” OR “pharynx” OR Tonsil OR Pillar OR “Buccal Mucosa” OR “Head and neck” OR “Head & neck”)

Search date: 1.26.2022

Results: 106