

Palatal keratosis associated with reverse (or “backwards”) smoking (PKARS)

John Won, Hadleigh Clark

Palatal mucosal changes secondary to smoking habits have been recognised since the time of Sir James Paget in the 19th century.¹ Smoker’s palate, or nicotinic stomatitis (NS) is most associated with habitual cigar or pipe smoking, yet may appear with conventional cigarette use, as well as regular consumption of thermally hot beverages.^{2,3} Recently, NS has been identified with higher prevalence in those who vape.⁴ NS is considered of negligible malignant transformation risk—typically resolving on habit cessation—even after many years.³

However, a variant—palatal keratosis associated with reverse smoking (PKARS)—is recognised as an established oral potentially malignant disorder (OPMD), distinct from leukoplakia and clinicopathologically separate from NS.^{5,6} Reverse smoking involves smoking the lit end of the cigarette intraorally and PKARS may lead to palatal squamous cell carcinoma development (SCC).^{5,7,8} We are highlighting a case to create awareness for screening unusual

smoking habits, with reference to the palate as an overlooked site in oral cancer screening.

Case report

A 44-year-old Kapampangan-speaking Filipina was referred and seen for assessment in April 2021 for asymptomatic palatal changes incidentally noticed by her dentist. There was no contributory medical/medication history, however she reported a 30-year history of reverse smoking or “*pagsigarilyo ng pabaliktad*” (“backwards smoking”) via an interpreter.

Clinically, there was no head and neck lymphadenopathy. Intraorally, findings were of diffuse palatal mucosal thickening, with discrete areas of increased plaque thickness and yellow pigmentation extending to the palatal rugae. The maxillary teeth also demonstrated extrinsic staining (Figure 1).

Three mapping biopsies were performed under local anaesthetic. Histology demonstrated hyperker-

Figure 1: Clinical photograph demonstrating palatal changes with thickening, yellow discolouration, umbilication and fissuring secondary to reverse smoking.



atosis and acanthosis of the squamous epithelium, with mild, patchy sub-epithelial chronic inflammation. There was no dysplasia or malignancy.

A diagnosis of PKARS was established. The patient was counselled of the potential risk of SCC development and cessation advice was provided; family members were also screened for the habit (negative). Referral was made to smoking cessation support services, but unfortunately the patient did not attend these, nor scheduled oral mucosal surveillance recalls, and has been lost to follow-up.

Discussion

Reverse smoking is seldom reported in Western countries. It has been identified as a regional practice amidst ethnocultural groups in Asia (India, Phillipines), Central and South America (Columbia, Panama, Venezuela, Caribbean Islands) and Europe (Sardinia), or expatriate communities thereof.^{7,8} The majority of published English language studies arise from more than two decades ago and predominate from the Andhra Pradesh region of India, where the habit is endemic and socially accepted amidst coastal communities, even today.^{6,8-10} Occasional case reports and observational studies also appear in contemporary Hispanic medical literature. Examples of the regional

terminology for the habit are provided (Table 1).

In contrast to conventional cigarette smoking, reverse smoking predominates in females, occurring mostly after the third decade, typically using hand-rolled cheroot cigarettes.⁶⁻⁸ A commonality to all practicing cultural groups is that populations reside in tropical/subtropical locations, fishing communities, rainy mountainous areas or those with abundant morning dew: the habit is thought to prevent the cigarette from going out and allows it to be consumed slowly. It is often performed with discretion from males in the community and may be passed down generationally.¹⁰ Table 2 highlights regional language terms for the habit.

Where it is practiced, as many as 50% of all oral malignancies are found on the palate, a site usually spared other OPMDs.⁵ The anatomical location of the palate means it is often overlooked during routine oral screening procedures.⁷

Clinical changes seen in PKARS are those of NS with additional features of dyspigmentation, fissuring, white plaque change with yellow-brown staining, papillary excrescences (1–3mm) or umbilication of the palatal duct openings, and frank ulceration.^{6,8,9} It is usually asymptomatic, except where ulcers are present.⁸ Clinical and histological features of PKARS are contrasted against NS in Table 2.

Table 1: Regional examples of reverse smoking terminology.

Terminology (English transliteration)	Language	Country or region	Example reference
<i>Aḍḍa pōgā / adda chutta</i> (“reverse smoking”)	Telugu	India (Andhra Pradesh)	Bharath, et al. J Oral Maxillofac Pathol. 2015;19(2):182-187.
<i>Candela pa den</i> (“the fire within”)	Papiamentu (Portuguese Creole)	Dutch Caribbean (Aruba, Bonaire, Curaçao)	Schoenfeld & Holzberger. Arch Dermatol. 1963;90(1):89-90.
<i>Hábito de fumar (cigarro-/cigarillo) invertido/invertida</i> (“habit of smoking (cigars/cigarettes) inverted”)	Spanish	Columbia Ecuador	Ardila Medina et al. Revista Archivo Médico de Camagüey 2013. 17(3): 405-415. Quiñonez & López-Ulloa. Acta Odontológica Colombiana 2019. 9(2):102-110.
<i>Fogu a intru</i> (“the fire within”)	Sardinian	Italy	Racugno. Radiobiol. Radioter. Fis. Med 1958;13:221.
<i>Fumar con la candela pa’ dentro</i> (“smoking with the candle inside”)	Spanish	Venezuela	Ludmagally & Sijas Brunicardi. Acta odontológica venezolana 1991; 29(2):60-4.
<i>Pagsigarilyo ng pabaliktad</i> (“smoking backwards”)	Kapampangan	Phillipines	This study

Conclusion

To the authors’ knowledge, we are not aware of similar cases having been reported in New Zealand. While the total numbers of expatriate communities in whom this occurs are expected to be low in the New Zealand populace, it behoves

clinicians to consider alternative smoking habits in migrant population groups, especially from the aforementioned regions. If PKARS is suspected alongside a confirmed reverse smoking habit, referral should be made to an appropriate head and neck/maxillofacial surgical service, or related discipline, for biopsy and follow-up.

Table 2: Clinical and histologic findings in nicotinic stomatitis versus palatal keratosis associated with reverse smoking (PKARS).

	Nicotinic stomatitis	Palatal keratosis associated with reverse smoking
Clinical features	Hyperpigmentation	Hyperpigmentation and/or hypopigmentation
	Mild erythema and whitening of palatal mucosa	Marked erythema and diffuse whitening of palatal mucosa Atrophy sometimes present
	Mucosal thickening with blanching	Prominent fissuring and nodularity Yellow-brown staining of mucosa
	Erythematous minor salivary duct openings (“red dots”) surrounded by keratotic rings	Papillary excrescences (1–3mm) or umbilications of duct opening
	Extrinsic staining of teeth	Extrinsic staining of teeth
		White/red plaque changes
		Frank ulceration
Histologic features	Increased melanin in basal layer of epithelium	Increased melanin in basal layer of epithelium or depigmented basal layer of epithelium
	Mild chronic inflammation, lymphatic dilatation, thickening of blood vessels	Often rete ridges absent and varying degree of inflammation in connective tissue
	Hyperorthokeratosis, parakeratosis and acanthosis	Hyperorthokeratosis > parakeratosis
	Squamous metaplasia/hyperplasia of excretory ducts and keratin plugging	Increased hyperplasia and hypertrophy of ductal epithelium; cystic dilatation and acinar atrophy
	Epithelial hyperplasia	Epithelial dysplasia or carcinoma
	Spongiosis and thinning of epithelium	Presence of koilocytes
		Eosinophilic bodies in basal layer of epithelium or beneath epithelium, similar to Civatte bodies

COMPETING INTERESTS

Nil.

AUTHOR INFORMATION

John (Jong Yoon) Won, Oral Medicine Registrar, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, New Zealand.

Hadleigh Clark, Oral Medicine Specialist, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, New Zealand.

CORRESPONDING AUTHOR

Dr Hadleigh Clark, BSc, BDS, MBChB, DCLinDent (OralMed), Oral Medicine Specialist, Hospital & Specialist Dentistry, Te Whatu Ora Te Toka Tumai Auckland, Level 1, Building 4, Greenlane Clinical Centre, 214 Green Lane West, Epsom, Auckland 1051 New Zealand. E: hadleighc@adhb.govt.nz

REFERENCES

1. Sarode S, Sarode G, Tupkari J. Oral potentially malignant disorders: A proposal for terminology and definition with review of literature. *J Oral Maxillofac Pathol.* 2014;18(4):77. doi:10.4103/0973-029X.141322.
2. dos Santos RB, Katz J. Nicotinic stomatitis: positive correlation with heat in maté tea drinks and smoking. *Quintessence Int.* 2009;40(7):537-540.
3. Neville BW, Damm DD, Allen CM, Chi AC. Nicotinic stomatitis. In: *Oral and Maxillofacial Pathology*. 4th ed. W.B. Saunders; 2016:368-369.
4. Bardellini E, Amadori F, Conti G, Majorana A. Oral mucosal lesions in electronic cigarettes consumers versus former smokers. *Acta Odontol Scand.* 2018;76(3):226-228. doi:10.1080/00016357.2017.1406613.
5. Warnakulasuriya S, Kujan O, Aguirre-Urizar JM, et al. Oral potentially malignant disorders: A consensus report from an international seminar on nomenclature and classification, convened by the WHO Collaborating Centre for Oral Cancer. *Oral Dis.* 2021;27(8):1862-1880. doi:10.1111/odi.13704.
6. Bharath TS, Kumar NGR, Nagaraja A, Saraswathi TR, Babu GS, Raju PR. Palatal changes of reverse smokers in a rural coastal Andhra population with review of literature. *J Oral Maxillofac Pathol.* 2015;19(2):182-187. doi:10.4103/0973-029X.164530.
7. Ortiz GM, Pierce AM, Wilson DF. Palatal changes associated with reverse smoking in Filipino women. *Oral Dis.* 1996;2(3):232-237. doi:10.1111/j.1601-0825.1996.tb00230.x.
8. Pindborg JJ, Mehta FS, Gupta PC, Daftary DK, Smith CJ. Reverse smoking in Andhra Pradesh, India: a study of palatal lesions among 10,169 villagers. *Br J Cancer.* 1971;25(1):10-20. doi:10.1038/bjc.1971.2.
9. Naveen-Kumar B, Tatapudi R, Sudhakara-Reddy R, Alapati S, Pavani K, Sai-Praveen KN. Various forms of tobacco usage and its associated oral mucosal lesions. *J Clin Exp Dent.* 2016;8(2):e172-177. doi:10.4317/jced.52654.
10. Medina CMA, Gómez RJ, Martínez EÁ. Systematic revision of the effects of the reversed smoking habit on the oral mucosa. *Rev Arch Méd Camagüey.* 2013;17(3):336-346.