REVIEW ARTICLE

Radiographic Appearance of Susuk in the Facial Region: A Systematic Review

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ABSTRACT

The purpose of this study was to integrate the available data published to date on susuk or charm needles into a comprehensive analysis of their clinical/radiological features. An electronic search was undertaken in September 2019. Eligibility criteria included publications having enough clinical and radiological to confirm a definite diagnosis. The initial literature search resulted in 48 publications. Ten publications were excluded for duplicates, and another 17 excluded after a screening of the abstract. Besides, the screening of the abstract shows that five publications were not meeting the inclusion criteria, resulting in a total of 14 publications of susuk that were included in the systematic review. Bias analysis was conducted according to Oxford Center for Evidence-Based Medicine. The resulting total of 78 cases from the selected publications were analysed, showing a wide age range with different distribution among gender and ethnicity. Three cases reported in the literature having symptoms related to susuk. Susuk can be seen as an incidental finding during a routine radiographic assessment, and clinicians should be able to differentiate it from other radiopaque foreign bodies. The practice is not limited to South East Asian population and can be seen in wide racial profiles.

Keywords: Susuk, Radiograph, Dentistry, Systematic Review

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INTRODUCTION

Susuk, or also known as charm needle and pin, or talisman is a 0.5-1.0mm diameter and 0.5-1.0cm long gold needle with sharp on one end and blunt on the other end (1). They are inserted by Malay medicine man or shaman known as bomoh under the skin surface in the face or other body parts (2). They are commonly detected during routine radiographic examination and present as a radiopaque material. Traditionally, they are reported to be practised by Malay community but eventually the practice sought by people of different religions and ethnicity in the South East Asia region, especially in Malaysia, Indonesia, Brunei, and Singapore (1).

Since there is a global surge of migrations and tourism, especially about people from South East Asia, the knowledge about susuk is essential to avoid misdiagnosis and confusion among healthcare providers. The knowledge about this talisman may aid the diagnosis of foreign body material seen in the radiographic examination and prevent unnecessary tests done to the patient.

This study aimed to illustrate and describe the radiographic appearance of susuk located in the facial region seen in the radiograph, and to determine the age, ethnicity, and any symptoms related to wearing susuk in the facial area.

MATERIALS AND METHODS

This study followed PRISMA Statement guideline (3) and flow was simplified into Figure 1.

Search strategies

An electronic search without time restrictions was taken on September 2019 in the following database: Web of Science and SCOPUS. The following terms were used in the search strategies: (charm needle) OR susuk. Google Scholar and PubMed-Medline database were also searched for potential publications. The authors did a manual search with all related oral pathology, oral medicine, oral surgery, oral radiology, restorative dentistry, orthodontics and periodontics journals. The reference list of identified studies and review articles were checked for possible additional studies. The radiographic appearance was identified as susuk by authors in all the publications selected, and publications not having the term “susuk” or “charm needle” in the title of articles were also selected for further evaluation in this study. Case reports, short communications, reviews as well as original articles were screened.

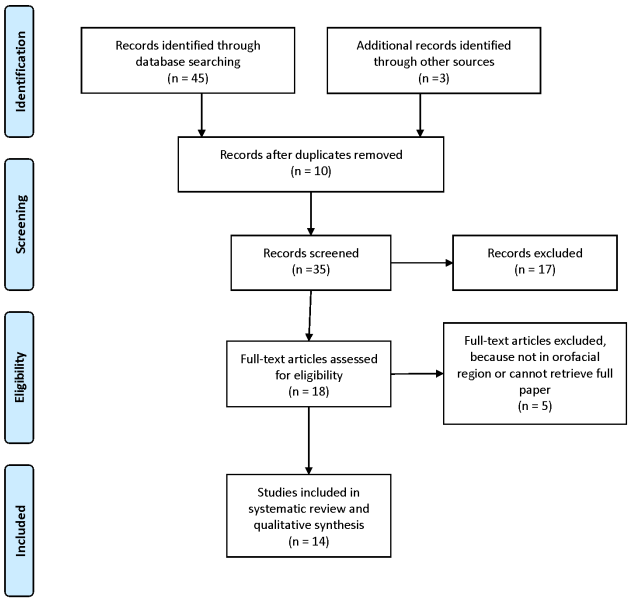

Figure 1: The PRISMA Flow Diagram

Inclusion and exclusion criteria

Articles reporting about susuk appearance in the radiograph were included. Definition by Loh and Yeo (2) were used to identify the susuk. Both types of case series and reports were included in the study. Exclusion criteria for this study include susuk outside the facial region, inadequate description without accompanying radiograph in the article, or inability to trace the full article from the electronic database or the library.

Study selection

At first, the titles and abstracts of all reports from the electronic searches. The shortlisted titles were read independently by the authors. Full-length article was obtained when the abstract appeared meeting the inclusion criteria, or insufficient details described in the abstract. A discussion between the authors solved disagreements. Grey publications are excluded from the study, with at least a peer-reviewed article are considered. Bias analysis was conducted according to The Oxford 2011 Levels of Evidence (4).

Data extraction

The data were extracted independently extracted using a custom-designed data extraction form. For all the articles included in the study, the following data were obtained whenever available which were year of publication, original country of publication, number of cases, gender (male or female), age, ethnicity (Malay, Chinese, Indian, or others), type of x-ray taken (intraoral, panoramic, or others), number of susuk on radiograph, any specific complain regarding the susuk, and reason for inserting susuk. If multiple radiographs are showing different numbers of susuk, only the radiographs having the most numbers will be considered in the analysis.

RESULTS

Literature search

The summary for study selection is simplified into Figure 1. The literature search resulted in 14 articles suited the inclusion criteria, and from these, 78 cases of susuk reported were found. There were nine articles from Malaysia, two from Singapore and one from Saudi Arabia, the USA and the UK, based on the affiliation of the first authors.

Description of the studies

The result of the literature search is compiled in Table 1. A total of 78 cases are included in the analysis. The largest number of cases reported in one publication is 33 cases. All of the publications were case reports or case series having level 4 evidence. The age during the radiographic examination ranges from 15 to 94 years old. However, the exact age when the susuk was inserted was not mentioned in any of the publications. The majority of the susuk wearers are female with gender distribution as 57 females and 21 males. The ethnicities of susuk wearers are 37 Malay, 18 Chinese, 13 Indian, three other ethnicities include Indonesian, Korean and one Caucasian; meanwhile, 7 cases are not specified. The number of susuk varies from one to 80 for each patient. The susuk were mostly seen as incidental radiographic finding for various reasons that requires x-ray examinations. Only three cases reported having symptoms from the susuk. The reason why the patients inserting susuk were mentioned in 12 cases from the literature and most patients did not want to discuss any further regarding the practice with their respective medical doctor or dentist

DISCUSSIONS

Susuk is a well-known traditional mystical ritual practised in Malay Archipelago in South East Asia. The act is forbidden in Islamic teaching because if it is solicited with sihir, or a demonic ritual (17). The susuk is inserted by bomoh or Malay shaman. A ritual ceremony was conducted during the insertion of susuk. The bomoh will usually rub oil before insertion of susuk at implantation area accompanied by special chanting (7). Susuk is worn for many reasons, including to preserve the beauty, to get good charisma, preventing spouse infidelity, successful business and protection from harm (6).

The majority of the cases of susuk reported are from Malay ethnicity, followed by Chinese and Indian. Even though originally practised by the Malay people, the practice has spread to other ethnicities through assimilation of culture in the region (16). Interestingly, even Caucasian patient in Malaysia, Korean patient in USA and one case from the UK were diagnosed with susuk in previous

Table I: Summary of cases reported in the literature

Author	Country	No of cases	Ethnicity	Age	Gender	Xray type	No of susuk	Complain form susuk	Reason for insertion
Ajura and Lau (5)	Malaysia	2	Not specified	49-65 Mean: 57	2 Female	Pano	3-60	No	Inserted by mother
Arishiya and Faraz (6)	Malaysia	2	2 Malay	32-50 Mean: 41	1 Male 1 Female	IOPA Pano	1-2	No	Not specified
Balasundram (7)	Malaysia	7	3 Malay 3 Chinese 1 Indian 1 Caucasian	35-67 Mean: 50.8	2 Male 5 Female	IOPA Pano OMV	1-5	1 complain of paraes-thesia, sinusitis	For beauty, protection, and one case inserted by unknown third party
Divakar (8)	Saudi Arabia	1	Not specified	55	1 Female	Pano	15	No	Not specified
Garg (9)	Malaysia	2	Not specified	50	1 Male 1 Female	Pano	1-4	No	For beauty
Jurkiewicz (10)	USA	1	1 Korean	94	1 Female	MDCT	50	No	Not specified
Kanneppady (11)	Malaysia	1	1 Chinese	38	1 Female	Pano	11	No	For beauty
Loh (2)	Singapore	12	7 Malay 2 Chinese 3 Indian	25-65 Mean: 41	4 Male 8 Female	IOPA Pano	1-32	2 cases with complaint of recurrent pain and swelling	Not specified
Sharif (12)	United Kingdom	1	Not specified	15	1 Female	Pano	5	No	Inserted by unknown third party
Tandjung (1)	Malaysia	1	1 Chinese	50	1 Female	Pano	5	No	Inserted by unknown third party: maid?
Teo (13)	Singapore	1	1 Indonesian	69	1 Female	PA Skull	32	No	Not specified
Varghese (14)	Malaysia	1	Not specified	41	1 Female	Pano	1	No	For beauty
Nambiar (15)	Malaysia	33	16 Malay 10 Chinese 7 Indian	33-69	10 Male 23 Female	IOPA Pano OMV PA view Lateral skull	1-39	No	1 case for beauty
Nor (16)	Malaysia	13	10 Malay 2 Indian 1 Chinese	30-65 Mean: 48.3	3 Male 10 Female	Pano OMV SMV PA View	1-80	No	Not specified

Pano: Panoramic radiograph
IOPA: Intraoral periapical
OMV: Occipito-mental view
MDCT: Medical Computed Tomography
PA: Postero-anterior
SMV: Submento-vertex

studies. This proved that the practice dispersed globally and important for clinicians to diagnose it.

Susuk can be implanted throughout the whole body, and the most popular location is in the facial region (1). In the facial area, the common site for susuk includes the mid-facial area of the cheeks, chin and eyebrows except at the temporomandibular joint area (5, 15). Susuk can be found as a single pin or multiple pins. The lower jaw is the location of choice for single susuk (15). Nor et al. reported the biggest number of susuk found in a single patient in the facial region., and at least 80 susuks were counted from the occipitomental view radiograph (16).

Even though less common than the facial area, several publications reported the incidental finding of the needle-like radiopaque material in the body. Case of susuk in thorax area was reported by Lim et al. (18). Another publication by Pothiawala reported two cases of susuk in the pelvic region and the left flank area (19), and Pande reported two cases of susuk in the knee and one case in the lumbar-sacral area (20). Another case of susuk in the lower limb area was reported by Hussin et al. (21). These reports proved that susuk could be inserted in many parts of the body; however, they are more commonly found in the facial region.
The earliest published report found about the radiographic appearance of susuk was retrieved in 1928 by a Burmese physician, and it was worn in the body as a talisman for safety against any harm. The description of the charm needle matches the criteria in our study. However, it was inserted into different parts of the body except for the facial area (22).

The susuk can be identified from both intraoral and extraoral dental radiographs. The literature reported that susuk could be identified from various radiographic techniques of the facial region, including the intraoral periapical, panoramic, occlusal, occipitomental, lateral skull, posteroanterior, submento-vertex, and lateral oblique projections. One case was diagnosed with head computed tomography (CT) (10). Nambiar et al. reported that a panoramic radiograph can detect a smaller number of susuk when compared to different types of the extraoral radiograph, and this is due to the limitation of imaging outside the focal trough in panoramic radiograph (15). This may conclude that there might under-reporting of the number of susuk since the majority of the cases reported only have one panoramic radiograph.

Dentists, surgeons, and physicians from mainly from the western part of the world may not be familiar with the incidental finding of susuk in the radiograph

A publication fro the United Kingdom by Sharif et al. reported that they proceed with many tests to determine the multiple radiopaque foreign bodies located medial to mandibular rami. Differential diagnoses made include surgical clips, brachytherapy beads, markers for growth study, jewellery, or susuk. The authors decided that susuk was the most probable origin of these radiopaque object (12). However, the location of the intraoral insertion pathway in the described case is not commonly practised by bomohs in the South East Asian regions.

Another differential diagnosis for the sharp radiopaque objects in the facial region may include foreign body due to post-trauma, root canal filling material, silverpoint, dental pins or broken acupuncture needles. Scratch mark, fixer solution stain may be a differential diagnosis for a periapical film (1, 13). Acupuncture needle can be ruled out from susuk because it is longer and finer, and not commonly left in the subcutaneous tissue (1).

Gold thread therapy is also radiopaque on x-ray. Generally, susuk can be differentiated from a gold thread from a radiographic appearance. The gold thread appears as irregularly shaped strings with a thread-like shape with less thickness (23-25) than susuk from our study that showed more regular needle-like shape. The explanation is hoped to give a clear description to clinicians on diagnosing susuk found in the radiograph. About the metallic component used in manufacturing the susuk, it was previously suggested that it might interfere and cause harm when the patient is to be prescribed with magnetic resonance imaging (MRI). Nor et al. (16) suggested that susuk wearer is contraindicated for MRI investigation. A study by Nambiar et al. (15) proved that susuk is safe for MRI and did not cause artefact and distortion with the magnetic procedure. They tested susuk embedded in hardened jelly to simulate human tissue with a 1.5T MRI machine, under a T2 weighted brain protocol. However, since there is no standardisation for the manufacturing of the susuk, there is no way to confirm the safety of susuk when exposed into a magnetism like MRI. The ferromagnetism effect of susuk with MRI with higher magnetic field 2.0T and above are not known and the issue was raised by Balasundram et al. (7).

The susuk in Malaysian context was either purchased by the patient from a local goldsmith at a price of RM2 to RM 3 per piece or approximately USD 0.50 or obtained by the bomoh himself and charged at RM10 or USD 2.50 for one susuk (7). The material study from susuk removed surgically from patients by Loh and Ling suggested that susuk is made by about 90% gold alloyed with some amount of copper to increase hardness, thus helping manipulation for insertion (26). Another chemical analysis by Balasundram et al. (7) showed that the susuk from their sample has less than 90% gold and mixed with copper, silver, aluminium, iron, and silicon. There was no significant difference between susuk bought from a local goldsmith and susuk retrieved surgically from the patient. However, gold is chosen for its noble material, and non-corrosive property, while copper is used for increasing the strength and hardness of the talisman (7, 26).

The high percentage of gold in susuk makes it presumed as biocompatible to human tissues. This makes the susuk to be inert and not causing a problem to the wearer (15). However, our review reported 3 cases of symptoms associated with the susuks. The symptoms include pain, swelling, and paraesthesia in the area with susuk (2, 7). One symptomatic case reported by Balasundram et al. (7) was having the susuk removed via extraoral excision with local anaesthesia, with manual palpation to locate the position. Another attempt to locate and remove the susuk from another patient by the same authors has failed. The susuk in the deeper layer cannot be localised with the ultrasound method due to echo reflection and white image reflection. Other reported cases in the literature do not show any signs and symptoms.

CONCLUSIONS

As a conclusion, susuk can be seen during routine radiographic workout and clinicians should be able to differentiate it from other radiopaque foreign body material. They are not commonly causing any symptoms and safe to be left in situ as long as not causing any harm. The practice of susuk insertion not limited in the South East Asian region thus it is important for clinicians to have some idea when encountered with these thin, sharp radiopaque objects in the radiograph.

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