

QUIT SMOKING WITH NICOTINE REPLACEMENT THERAPY

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Abstract: Cigarette smoking is one of the leading causes of sickness and mortality. Due to the widespread usage of a variety of smoking methods as well as smokeless tobacco products, India's tobacco problem is extremely complicated. A number of recent papers have emphasised the importance of the dental profession being involved in tobacco intervention. The pharmacological effects of nicotine contribute to tobacco addiction, despite the fact that the majority of the toxicity of smoking is related to other hazardous components contained in cigarette smoke. As a result, all attempts to quit smoking are targeted at removing tobacco addiction by substituting clean nicotine for tobacco nicotine.

Key words: Smoking, Tobacco dependence, NRT

INTRODUCTION:

Today tobacco use is the single most prominent preventable reason for death on the planet. Tobacco associated mortality through smoking alone is estimated at 7 lakh deaths per year which is among the highest in the world. In India use of tobacco poses exceptional difficulties as it is accepted traditionally and culturally.¹

A wide scope of illnesses brought about by tobacco are one of the generous dangers everyone is confronting. It keeps on being the substance causing greatest wellbeing harm globally. The tobacco plant alludes to any of different agents from the class *Nicotiana* in the nightshade (*Solanaceae*) family. Tobacco contains nicotine as the principal alkaloid, which is the head modulator of the psychopharmacological impacts related with its addiction. Nicotine constructive outcomes on state of mind and discernment are solid fortifications for smokers that add to their enslavement and cigarette smoking is particularly addictive on the grounds that breathed-in nicotine is consumed through the pulmonary venous instead of the fundamental venous framework, and in this way arrives at the cerebrum in 10-20 seconds. The probability that a substance will be mishandled relies upon the time among organization and focal support, thus tobacco smoking can become addictive in an individual in a short time span. Smoking is thus a perplexing conduct including both pharmacological and mental components.²

The anticipation and control of tobacco use is one of the rising issues universally. Tobacco termination is one of the strategies which helps in improving the future and lessening the morbidity. Different pharmacological medications are accessible nowadays yet nicotine replacement treatment (NRT) is most broadly used. Nicotine replacement items (NRPs) contain unadulterated nicotine with a plan to lessen the patient's tendency towards tobacco utilization and the

Physiological and psychomotor withdrawal symptoms. They augment nicotine levels in the circulation system, because of which the individual will smoke less cigarettes, bringing about decrease in the utilization and poisonousness identified with it. This also decreases inspiration to devour tobacco and nicotine withdrawal signs, subsequently facilitating the change from cigarette smoking to complete forbearance. NRT's are well tolerated without any significant impact on the individual.³

Encyclopedia of surgery defines smoking cessation as the means "to quit smoking" or withdrawal from nicotine". Because smoking is highly addictive, quitting the habit often involves irritability, headache mood swings and cravings associated with the sudden cessation or reduction of tobacco use by a nicotine dependent individual.⁴

BACKGROUND:

NRT aims to reduce withdrawal symptoms associated with stopping smoking by replacing the nicotine from cigarettes. NRT is available as skin patches that deliver nicotine slowly, and chewing gum, nasal and oral sprays, inhalators, and lozenges/tablets, all of which deliver nicotine to the brain more quickly than skin patches, but less rapidly than from smoking cigarettes.⁵

MECHANISM OF ACTION:

The main mode of action of NRT is thought to be the stimulation of nicotinic receptors in the ventral tegmental area of the brain and the consequent release of dopamine in the nucleus accumbens.⁶ This and other peripheral actions of nicotine lead to a reduction in nicotine withdrawal symptoms in regular smokers who abstain from smoking. NRT may also provide a coping mechanism making cigarettes less rewarding to smoke. It does not completely eliminate the symptoms of

withdrawal, however, possibly because none of the available nicotine systems reproduce the rapid and high levels of arterial nicotine achieved when cigarette smoke is inhaled. All the available medicinal nicotine products rely on systemic venous absorption and do not therefore achieve such a rapid systemic arterial delivery.⁷ It takes a few seconds for high doses of nicotine from a cigarette to reach the brain; medicinal products achieve lower levels over a period of minutes (for nasal spray or oral products such as mgum, inhaler, sublingual tablet and lozenge) and hours (for transdermal patches).⁸

Various forms of Nicotine Replacement Therapy:

With the immediate release of nicotine, the various varieties of NRT treatments provide general and breakthrough desire reduction. All of these drugs have varying levels of potency and nicotine absorption rates. They are available through the following agencies: the US Food and Drug Administration (FDA), the Medicines and Healthcare Products Regulatory Agency (MHRA), and the Medicines and Healthcare Products Regulatory Agency (MHRA).⁹

a) Nicotine gum was the first readily available NRT product (Nicotine Polacrilex). It is available in quantities of 2 and 4 mg. According to studies, 4 mg chewable gum has a higher withdrawal success rate than 2 mg chewable gum. After a few weeks or months of use, the dosage is gradually reduced every day. It is recommended for a period of 6–12 weeks, with a maximum of 6 months. The chewing time is reduced after 2–3 months. The gum is broken up into little pieces, or the nicotine gum is replaced with sugar-free gum, putting an end to the habit. The transmucosal route is used for delivery. It is chewed intermittently and kept in the mouth until the taste becomes strong (about 30 minutes), after which it is inserted in the vestibule to absorb into the bloodstream.¹⁰ Acidic beverages such as soda, coffee, and beer should be avoided for at least 15 minutes before and after the procedure, since they may interfere with nicotine absorption through the buccal mucosa. In patients with temporomandibular joint disease or who wear dentures, it should be used with caution. Nicotine gum has the drawback of some people disliking the taste and experiencing withdrawal symptoms.¹⁰

b) Rapid release gum: The use of a special gum base allows for a combination of rapid initial nicotine release and biphasic nicotine delivery, resulting in rapid release gum. It also raises pH, allowing for faster absorption through the oral mucosa. The nicotine amount was

increased to provide immediate relief from cravings and overdose. Niaura et al. conducted a study to compare the efficacy of rapid-release nicotine gum vs. nicotine in relieving smoking cue-provoked craving. They discovered that rapid-release nicotine gum outperforms conventional nicotine gum because it is faster and provides complete relief from nicotine craving.¹¹

c) Nicotine Lozenge: The lozenge comes in two strengths: 2mg and 4mg. These instructions given for use and administration are identical to those for nicotine gum. It dissolves in the mouth over 30 minutes, with some variation between people. Nicotine from the lozenge is absorbed slowly through the buccal mucosa and transported into systemic circulation, just like nicotine gum. The lozenge is an alternative to chewing gum for people who need intermittent and controlled nicotine dose but don't like the taste of gum. The amount of nicotine absorbed per lozenge appears to be slightly higher than that of gum.¹²

d) Nicotine patch: is a transdermal patch that is simple to use and releases nicotine slowly. They come in a variety of doses ranging from 5, 10, and 15 mg patches that may be worn for up to 16 hours; however, 7, 14, and 21 mg patches can be worn for up to 24 hours. Instead of applying the patches throughout the day, patients can apply them once in the morning on clean, unbroken skin. Before going to night, remove the 16-hour patch, and the 24-hour patch the next morning. Nicotine patch users have higher plasma nicotine concentrations during the day than those who use other acute NRT (nicotine chew, spray, lozenges, and inhalers). Patients may have side effects of insomnia and even local skin irritations are reported.¹

e) High-dose nicotine patches: Initially, 22-mg high-dose nicotine patches were available, but they could only replace half of smokers' baseline serum nicotine and cotinine levels. As a result, greater doses of transdermal nicotine patches (42 mg) were necessary. It should be used once a day to clean, undamaged skin and removed before going to bed. Local discomfort and sleep problems are possible side effects. In a research of adult smokers, Schnoll et al. looked at whether extended transdermal nicotine therapy enhanced abstinence from tobacco more than normal length therapy. They found that extended therapy reduced the risk of lapse and increased the chances of recovery from lapses.¹

f) Nicotine oral inhaler: A nicotine inhaler is made out of a mouthpiece and a nicotine-filled plastic cartridge that looks like a cigarette or cigar. Each cartridge has a nicotine content of 10 mg. It can be sprayed in the mouth for a few seconds (not inhaled or swallowed); however, it must not come into contact with the lips. It is mostly utilised in patients who have a strong desire to smoke. Nicotine is delivered in the oral cavity, oesophagus, and stomach in around 36% of cases, and in the lungs in about 4% of cases. Nicotine inhalers were found to be effective and safe in reducing smoking over a duration of 24 months.¹³

g) Nicotine Nasal spray: It was created to give nicotine doses more quickly. A multi-dose container with a pump mechanism and a nozzle that dispenses 0.5 mg of nicotine every 50-uL squirt is accessible to consumers. Two squirts, one in each nostril, make up each dose. In comparison to other NRT formulations nicotine nasal spray is quickly absorbed into the blood stream. Patients should begin with one or two doses per hour, increasing to a maximum of 40 doses per day as tolerated. For 10 hours, one dose of nasal spray (1 mg nicotine) yields average plasma concentrations of 8ng/ml.¹

h) Nicotine sublingual tablets: For extremely nicotine dependent persons, the suggested dose of sublingual tablet is 16 to 24 pills daily (i.e. 2 mg tablets maximum 30 tablets throughout the day), but for low dependency, the recommended dose is 8–12 tablets daily. The tablet is placed under the tongue and does not need to be chewed. It is recommended to take it for at least 8–12 weeks, following which the quantity of tablets is gradually reduced. It should be taken with caution in individuals who are addicted to nicotine. The most common side effects include insomnia and mouth discomfort. Tonnesen et al. conducted a trial research in COPD patients to see whether the nicotine sublingual tablets and two degrees of assistance could help them quit smoking. They discovered that in COPD smokers, NRTs can be used for a longer period of time.¹⁵

i) Electronic cigattes: An electronic cigarette (e-cig, shisha pen, or personal vaporizer) is a device that produces vapor that resembles the look and feel of smoking. ENDS are devices that evaporate and deliver a chemical mixture, typically made up of nicotine, to the user's lungs. Each gadget is equipped with an electronic vaporisation system, rechargeable batteries, electronic controllers, and liquid vaporisation cartridges. Glycerol, propylene glycol, water, nicotine, and a variety of tastes

are commonly present in the liquid. Nicotine is given to the upper and lower respiratory tracts using this device without the need of combustion.^{16,17}

j) Combination therapy: Combining one drug that allows for passive nicotine delivery (e.g., transdermal patch) with another medicine that allows for ad libitum nicotine delivery is one technique for increasing NRT efficacy (e.g., gum, nasal spray, inhaler). The rationale for combining NRT medications is that smokers may require both a slow-acting preparation that can be administered on demand for immediate relief of breakthrough cravings and withdrawal symptoms, as well as a faster-acting preparation that can be administered on demand for immediate relief of cravings and withdrawal symptoms. The patch delivers nicotine in a steady-state, passive form, whereas the gum can be modified to meet specific needs.¹⁸

k) Nicotine vaccine: Nicotine vaccines are the most recent advancement in NRT. Nicotine is recognised as a foreign substance by a nicotine-based vaccination, which triggers an immune response against the drug. They cause drug-specific antibodies to mobilise, causing nicotine molecules in the blood to bind. This reduces the drug's behavioural effects by preventing it from reaching the brain.¹

l) Nicotine Preloading: Nicotine preloading refers to the use of a nicotine replacement therapy (NRT) before to a quit date while still smoking. It causes a decrease in a person's desire to smoke, resulting in a higher level of addiction and fewer cravings after stopping smoking. It is considered that nicotine preloading is reasonably beneficial in cigarette cessation since it enhances the rate of quitting; nevertheless, the evidence are limited.¹

DISCUSSION:

Tobacco use is the one of the main risk factor of chronic disease including cancer, lung diseases and cardiovascular disease. The main problem with nicotine delivered by cigarette tesis that it causes people to breathe in tobacco smoke over long periods. Cigarette smoke contains over 4000 toxic substances, many of which are teratogenic or carcinogenic. Of particular concern are carbon monoxide, oxidizing chemicals, aniline, phenol, ammonia, lead, and nitrogenoxide.⁴ Studies have shown that nicotine is not the direct cause of tobacco-related disease but only leads to tobacco addiction. The symptoms of nicotine withdrawal include2or more of the following within 24 hours of

cessation or reduction in nicotine intake i.e. anxiety, malaise or weakness, mouth ulceration, irritability or restlessness, increased cough, increased appetite, reduced concentration, dysphoric mood, insomnia, craving for tobacco (or other nicotine-containing products) These symptoms of withdrawal cause clinically significant distress, are not due to a general medical condition and are not better accounted for by another mental disorder. Effective management of nicotine dependence in patients will depend to a large extent on the timelines so management of withdrawal symptoms with NRT. The elimination half-life of nicotine is <2 hrs, which means that many patients will seek to smoke unless withdrawal symptoms can be prevented via timely and regular provision of NRT. It helps to replace some of the nicotine obtained from cigarettes, thus reducing withdrawal symptoms when stopping smoking.¹²

Nicotine replacement increases the odds of quitting smoking by around 60% compared to placebo. It reduces cravings for cigarettes and dampens nicotine withdrawal symptoms such as irritability, anxiety, depression and restlessness. The idea is to use “clean” nicotine, without them any additional toxins in tobacco smoke, for a limited period to “wean” off cigarettes. Compared to single types of NRT, quit rates can be increased by combining patches with 2mg oral nicotine products, for example, the gum, inhaler, lozenge or tablet.

A variety of clinicians in primary care settings including dentists and dental hygienists can play an important role in promoting smoking cessation. Two approaches have strong evidence of efficacy for smoking cessation sometimes counseling and pharmacotherapy. Within the standard treatment times, the dentist and the office team can encourage patients to quit using tobacco by pointing out the damage caused by tobacco to oral tissues and highlighting the general health benefits of quitting.⁷ Besides modifying risk behavior, prescribing approved pharmaceutical agents is known to increase the quit rates, and several reported trials have used these agents in various dental settings. The most significant barrier remains a lack of education of dentists and hygienists on cessation activities during their formative years of training. Effective training modules both at undergraduate and continuing education levels need to be introduced and implemented to allow the dental team to engage in smoking cessation activities at the primary care level. Most trials in dental settings report a quit rate comparable to what has been achieved by physicians.⁸

CONCLUSION:

Nicotine addiction is the leading reason of smoking cessation failure. Nicotine Replacement Therapy works by supplying pure nicotine at the right moment, posing less risks and reducing cravings. These nicotine treatments come in a variety of shapes, sizes, doses, and flavours. The patient's preference should usually guide the choice of NRT product. NRT appears to improve the chances of effectively quitting smoking and maintaining long-term abstinence. The dentist and the rest of the office staff must encourage patients to quit smoking by emphasising the harm that tobacco does to oral tissues and emphasising the overall health benefits of quitting.

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