

## = Aphthous stomatitis =

Aphthous stomatitis ( also termed recurrent aphthous stomatitis , recurring oral aphthae or recurrent aphthous ulceration ; from Greek : ????? aphtha , " mouth ulcer " ) is a common condition characterized by the repeated formation of benign and non @-@ contagious mouth ulcers ( aphthae ) in otherwise healthy individuals . The informal term canker sores is also used , mainly in North America , although this may also refer to any mouth ulcer .

The cause is not completely understood , but involves a T cell @-@ mediated immune response triggered by a variety of factors . Different individuals have different triggers , which may include nutritional deficiencies , local trauma , stress , hormonal influences , allergies , genetic predisposition or other factors .

These ulcers occur periodically and heal completely between attacks . In the majority of cases , the individual ulcers last about 7 ? 10 days , and ulceration episodes occur 3 ? 6 times per year . Most appear on the non @-@ keratinizing epithelial surfaces in the mouth ( i.e. anywhere except the attached gingiva , the hard palate and the dorsum of the tongue ) , although the more severe forms , which are less common , may also involve keratinizing epithelial surfaces . Symptoms range from a minor nuisance to interfering with eating and drinking . The severe forms may be debilitating , even causing weight loss due to malnutrition .

The condition is very common , affecting about 20 % of the general population to some degree . The onset is often during childhood or adolescence , and the condition usually lasts for several years before gradually disappearing . There is no cure , and treatments aim to manage pain , reduce healing time and reduce the frequency of episodes of ulceration .

## = = Signs and symptoms = =

Persons with aphthous stomatitis have no detectable systemic symptoms or signs ( i.e. , outside the mouth ) . Generally , symptoms may include prodromal sensations such as burning , itching , or stinging , which may precede the appearance of any lesion by some hours ; and pain , which is often out of proportion to the extent of the ulceration and is worsened by physical contact , especially with certain foods and drinks ( e.g. , acidic ) . Pain is worst in the days immediately following the initial formation of the ulcer , and then recedes as healing progresses . If there are lesions on the tongue , speaking and chewing can be uncomfortable , and ulcers on the soft palate , oropharynx , or esophagus can cause odynophagia ( painful swallowing ) . Signs are limited to the lesions themselves .

Ulceration episodes usually occur about 3 ? 6 times per year . However , severe disease is characterized by virtually constant ulceration ( new lesions developing before old ones have healed ) and may cause debilitating chronic pain and interfere with comfortable eating . In severe cases , this prevents adequate nutrient intake leading to malnutrition and weight loss .

Aphthous ulcers typically begin as erythematous macules ( reddened , flat area of mucosa ) which develop into ulcers that are covered with a yellow @-@ grey fibrinous membrane that can be scraped away . An erythematous " halo " surrounds the ulcer . The size , number , location , healing time , and periodicity between episodes of ulcer formation are all dependent upon the subtype of aphthous stomatitis .

## = = Causes = =

The cause is not entirely clear , but is thought to be multifactorial . It has even been suggested that aphthous stomatitis is not a single entity but rather a group of conditions with different causes . Multiple research studies have attempted to identify a causative organism , but aphthous stomatitis appears to be non @-@ contagious , non @-@ infectious and not sexually transmissible . The mucosal destruction is thought to be the result of a T cell ( T lymphocyte ) mediated immune response which involves the generation of interleukins and tumor necrosis factor alpha ( TNF @-@ ? ) . Mast cells and macrophages are also involved , secreting TNF @-@ ? along with the T cells .

When early aphthous ulcers are biopsied , the histologic appearance shows a dense inflammatory infiltrate , 80 % of which is made up of T cells . Persons with aphthous stomatitis also have circulating lymphocytes which react with peptides 91 ? 105 of heat shock protein 65 @-@ 60 , and the ratio of CD4 + T cells to CD8 + T cells in the peripheral blood of individuals with aphthous stomatitis is decreased .

Despite this preferred theory of immuno @-@ dysregulation held by most researchers , aphthous stomatitis behaves dissimilarly to autoimmune diseases in many regards . There is no association between aphthous stomatitis and other autoimmune diseases , which often accompany each other ; common autoantibodies are not detected , the condition tends to resolve spontaneously with advancing age rather than worsen , and usually serum immunoglobulins are at normal levels .

Evidence for the T cell @-@ mediated mechanism of mucosal destruction is strong , but the exact triggers for this process are unknown and are thought to be multiple and varied from one person to the next . This suggests that there are a number of possible triggers , each of which is capable of producing the disease in different subgroups . In other words , different subgroups appear to have different causes for the condition . These can be considered in three general groups , namely primary immuno @-@ dysregulation , decrease of the mucosal barrier and states of heightened antigenic sensitivity ( see below ) . Etiologic factors in aphthous stomatitis are also sometimes considered as either host @-@ related or environmental .

= = = Immunity = = =

At least 40 % of people with aphthous stomatitis have a positive family history , suggesting that some people are genetically predisposed to suffering with oral ulceration . HLA @-@ B12 , HLA @-@ B51 , HLA @-@ Cw7 , HLA @-@ A2 , HLA @-@ A11 , and HLA @-@ DR2 are examples of human leukocyte antigen types associated with aphthous stomatitis . However , these HLA types are inconsistently associated with the condition , and also vary according to ethnicity . People who have a positive family history of aphthous stomatitis tend to develop a more severe form of the condition , and at an earlier age than is typical .

Stress has effects on the immune system , which may explain why some cases directly correlate with stress . It is often stated that ulceration is exacerbated during examination periods and lessened during periods of vacation . Alternatively , it has been suggested that oral parafunctional activities such as lip or cheek chewing become more pronounced during periods of stress , and hence the mucosa is subjected to more minor trauma .

Aphthous @-@ like ulceration also occurs in conditions involving systemic immuno @-@ dysregulation , e.g. cyclic neutropenia and human immunodeficiency virus infection . In cyclic neutropenia , more severe oral ulceration occurs during periods of severe immuno @-@ dysregulation , and resolution of the underlying neutropenia prevents the cycle of ulceration . The relative increase in percentage of CD8 + T cells , caused by a reduction in numbers of CD4 + T cells may be implicated in RAS @-@ type ulceration in HIV infection .

= = = Mucosal barrier = = =

The thickness of the mucosa may be an important factor in aphthous stomatitis . Usually , ulcers form on the thinner , non @-@ keratinizing mucosal surfaces in the mouth . Factors which decrease the thickness of mucosa increase the frequency of occurrence , and factors which increase the thickness of the mucosa correlate with decreased ulceration .

The nutritional deficiencies associated with aphthous stomatitis ( B12 , folate , and iron ) can all cause a decrease in the thickness of the oral mucosa ( atrophy ) .

Local trauma is also associated with aphthous stomatitis , and it is known that trauma can decrease the mucosal barrier . Trauma could occur during injections of local anesthetic in the mouth , or otherwise during dental treatments , frictional trauma from a sharp surface in the mouth such as broken tooth , or from tooth brushing .

Hormonal factors are capable of altering the mucosal barrier . In one study , a small group of

females with aphthous stomatitis had fewer occurrences of aphthous ulcers during the luteal phase of the menstrual cycle or with use of the contraceptive pill . This phase is associated with a fall in progesterone levels , mucosal proliferation and keratinization . This subgroup often experiences remission during pregnancy . However , other studies report no correlation between aphthous stomatitis and menstrual period , pregnancy or menopause .

Aphthous stomatitis is uncommon in people who smoke , and there is also a correlation between habit duration and severity of the condition . Tobacco use is associated with an increase in keratinization of the oral mucosa . In extreme forms , this may manifest as leukoplakia or stomatitis nicotina ( smoker 's keratosis ) . This increased keratinization may mechanically reinforce the mucosa and reduce the tendency of ulcers to form after minor trauma , or present a more substantial barrier to microbes and antigens , but this is unclear . Nicotine is also known to stimulate production of adrenal steroids and reduce production of TNF  $\alpha$  , interleukin  $\alpha$  1 and interleukin  $\alpha$  6 . Smokeless tobacco products also seem to protect against aphthous stomatitis . Cessation of smoking is known to sometimes precede the onset of aphthous stomatitis in people previously unaffected , or exacerbate the condition in those who were already experiencing aphthous ulceration . Despite this correlation , starting smoking again does not usually lessen the condition .

== Antigenic sensitivity ==

It has been hypothesized that the condition represents a state of heightened sensitivity to antigenic stimuli , with cross reactivity of the resulting cell mediated immune response with cells of the epithelium . Some hypothesize that aphthous stomatitis is caused by expression of HLA class II antigens along with the normally found HLA class I antigens in epithelial cells , which results in them being recognized by the immune system as foreign cells rather than self . Various antigenic triggers have been implicated as a trigger , including L forms of streptococci , herpes simplex virus , varicella zoster virus , adenovirus , and cytomegalovirus .

Others argue that there is no available evidence that demonstrates that any of these organisms are capable of causing aphthous stomatitis by themselves . Some people with aphthous stomatitis may show herpes virus within the epithelium of the mucosa , but without any productive infection . In some persons , attacks of ulceration occur at the same time as asymptomatic viral shedding and elevated viral titres . However , antiviral medication has no effect on aphthous stomatitis .

In some instances , recurrent mouth ulcers may be a manifestation of an allergic reaction . Possible allergens include certain foods ( e.g. , chocolate , coffee , strawberries , eggs , nuts , tomatoes , cheese , citrus fruits , benzoates , cinnamaldehyde , and highly acidic foods ) , toothpastes , and mouthwashes . Where dietary allergens are responsible , mouth ulcers usually develop within about 12 ? 24 hours of exposure .

Sodium lauryl sulphate ( SLS ) , a detergent present in some brands of toothpaste and other oral healthcare products , may produce oral ulceration in some individuals . It has been shown that aphthous stomatitis is more common in people using toothpastes containing SLS , and that some reduction in ulceration occurs when a SLS free toothpaste is used . Some have argued that since SLS is almost ubiquitously used in oral hygiene products , there is unlikely to be a true predisposition for aphthous stomatitis caused by SLS .

== Systemic disease ==

Aphthous like ulceration may occur in association with several systemic disorders ( see table ) . These ulcers are clinically and histopathologically identical to the lesions of aphthous stomatitis , but this type of oral ulceration is not considered to be true aphthous stomatitis by some sources . Some of these conditions may cause ulceration on other mucosal surfaces in addition to the mouth such as the conjunctiva or the genital mucous membranes . Resolution of the systemic condition often leads to decreased frequency and severity of the oral ulceration .

Behçet 's disease is a triad of mouth ulcers , genital ulcers and anterior uveitis . The main feature of

Behçet 's disease is aphthous @-@ like ulceration , but this is usually more severe than seen in aphthous stomatitis without a systemic cause , and typically resembles major or herpetiforme ulceration or both . Aphthous @-@ like ulceration is the first sign of the disease in 25 ? 75 % of cases . Behçet 's is more common in individuals whose ethnic origin is from regions along the Silk Road ( between the Mediterranean and the Far East ) . It tends to be rare in other countries such as the United States and the United Kingdom . MAGIC syndrome is a possible variant of Behçet disease , and is associated with aphthous @-@ like ulceration . The name stands for " mouth and genital ulcers with inflamed cartilage " ( relapsing polycondritis ) .

PFAPA syndrome is a rare condition that tends to occur in children . The name stands for " periodic fever , aphthae , pharyngitis ( sore throat ) and cervical adenitis " ( inflammation of the lymph nodes in the neck ) . The fevers occur periodically about every 3 ? 5 weeks . The condition appears to improve with tonsillectomy or immunosuppression , suggesting an immunologic cause .

In cyclic neutropenia , there is a reduction in the level of circulating neutrophils in the blood that occurs about every 21 days . Opportunistic infections commonly occur and aphthous @-@ like ulceration is worst during this time .

Hematinic deficiencies ( vitamin B12 , folic acid and iron ) , occurring singly or in combination , and with or without any underlying gastrointestinal disease , may be twice as common in people with RAS . However , iron and vitamin supplements only infrequently improve the ulceration . The relationship to vitamin B12 deficiency has been the subject of many studies . Although these studies found that 0 ? 42 % of those with recurrent ulcers suffer from vitamin B12 deficiency , an association with deficiency is rare . Even in the absence of deficiency , vitamin B12 supplementation may be helpful due to unclear mechanisms . Hematinic deficiencies can cause anemia , which is also associated with aphthous @-@ like ulceration .

Gastrointestinal disorders are sometimes associated with aphthous @-@ like stomatitis , e.g. most commonly Celiac disease , but also inflammatory bowel disease such as Crohn 's disease or ulcerative colitis . The link between gastrointestinal disorders and aphthous stomatitis is probably related to nutritional deficiencies caused by malabsorption . Less than 5 % of people with RAS have Celiac disease , which usually presents with severe malnutrition , anemia , abdominal pain , diarrhea and glossitis ( inflammation of the tongue ) . Sometimes aphthous @-@ like ulcerations can be the only sign of celiac disease . Despite this association , a gluten @-@ free diet does not usually improve the oral ulceration .

Other examples of systemic conditions associated with aphthous @-@ like ulceration include Reactive arthritis ( Reiter 's syndrome ) , and recurrent erythema multiforme .

= = Diagnosis = =

Diagnosis is mostly based on the clinical appearance and the medical history . The most important diagnostic feature is a history of recurrent , self healing ulcers at fairly regular intervals . Although there are many causes of oral ulceration , recurrent oral ulceration has relatively few causes , most commonly aphthous stomatitis , but rarely Behçet 's disease , erythema multiforme , ulceration associated with gastrointestinal disease , and recurrent intra @-@ oral herpes simplex infection . A systemic cause is more likely in adults who suddenly develop recurrent oral ulceration with no prior history .

Special investigations may be indicated to rule out other causes of oral ulceration . These include blood tests to exclude anemia , deficiencies of iron , folate or vitamin B12 or celiac disease . However , the nutritional deficiencies may be latent and the peripheral blood picture may appear relatively normal . Some suggest that screening for celiac disease should form part of the routine work up for individuals complaining of recurrent oral ulceration . Many of the systemic diseases cause other symptoms apart from oral ulceration , which is in contrast to aphthous stomatitis where there is isolated oral ulceration . Patch testing may be indicated if allergies are suspected ( e.g. a strong relationship between certain foods and episodes of ulceration ) . Several drugs can cause oral ulceration ( e.g. nicorandil ) , and a trial substitution to an alternative drug may highlight a causal relationship .

Tissue biopsy is not usually required , unless to rule out other suspected conditions such as oral squamous cell carcinoma . The histopathologic appearance is not pathognomonic ( the microscopic appearance is not specific to the condition ) . Early lesions have a central zone of ulceration covered by a fibrinous membrane . In the connective tissue deep to the ulcer there is increased vascularity and a mixed inflammatory infiltrate composed of lymphocytes , histiocytes and polymorphonuclear leukocytes . The epithelium on the margins of the ulcer shows spongiosis and there are many mononuclear cells in the basal third . There are also lymphocytes and histiocytes in the connective tissue surrounding deeper blood vessels near to the ulcer , described histologically as " perivascular cuffing " .

#### == = Classification = = =

Aphthous stomatitis has been classified as a type of non @-@ infectious stomatitis ( inflammation of the mouth ) . One classification distinguishes " common simple aphthae " , accounting for 95 % of cases , with 3 ? 6 attacks per year , rapid healing , minimal pain and restriction of ulceration to the mouth ; and " complex aphthae " , accounting for 5 % of cases , where ulcers may be present on the genital mucosa in addition to mouth , healing is slower and pain is more severe . A more common method of classifying aphthous stomatitis is into three variants , distinguished by the size , number and location of the lesions , the healing time of individual ulcers and whether a scar is left after healing ( see below ) .

#### == = = Minor aphthous ulceration = = = =

This is the most common type of aphthous stomatitis , accounting for about 80 ? 85 % of all cases . This subtype is termed minor aphthous ulceration ( MiAU ) , or minor recurrent aphthous stomatitis ( MiRAS ) . The lesions themselves may be referred to as minor aphthae or minor aphthous ulcers . These lesions are generally less than 10 mm in diameter ( usually about 2 ? 3 mm ) , and affect non @-@ keratinized mucosal surfaces ( i.e. the labial and buccal mucosa , lateral borders of the tongue and the floor of the mouth ) . Usually several ulcers appear at the same time , but single ulcers are possible . Healing usually takes seven to ten days and leaves no scar . Between episodes of ulceration , there is usually an ulcer @-@ free period of variable length .

#### == = = Major aphthous ulceration = = = =

This subtype makes up about 10 % of all cases of aphthous stomatitis . It is termed major aphthous ulceration ( MaAU ) or major recurrent aphthous stomatitis ( MaRAS ) . Major aphthous ulcers ( major aphthae ) are similar to minor aphthous ulcers , but are more than 10 mm in diameter and the ulceration is deeper . Because the lesions are larger , healing takes longer ( about twenty to thirty days ) , and may leave scars . Each episode of ulceration usually produces a greater number of ulcers , and the time between attacks is less than seen in minor aphthous stomatitis . Major aphthous ulceration usually affects non keratinized mucosal surfaces , but less commonly keratinized mucosa may also be involved , such as the dorsum ( top surface ) of the tongue or the gingiva ( gums ) . The soft palate or the fauces ( back of the throat ) may also be involved , the latter being part of the oropharynx rather than the oral cavity . Compared to minor aphthous ulceration , major aphthae tend to have an irregular outline .

#### == = = Herpetiform ulceration = = = =

Herpetiform ulcers , ( also termed stomatitis herpetiformis , or herpes @-@ like ulcerations ) is a subtype of aphthous stomatitis so named because the lesions resemble a primary infection with herpes simplex virus ( primary herpetic gingivostomatitis ) . However , herpetiform ulceration is not caused by herpes viruses . As with all types of aphthous stomatitis , it is not contagious . Unlike true herpetic ulcers , herpetiforme ulcers are not preceded by vesicles ( small , fluid filled blisters ) .

Herpetiforme ulcers are less than 1 mm in diameter and occur in variably sized crops up to one hundred at a time . Adjacent ulcers may merge to form larger , continuous areas of ulceration . Healing occurs within fifteen days without scarring . The ulceration may affect keratinized mucosal surfaces in addition to non keratinized . Herpetiform ulceration is often extremely painful , and the lesions recur more frequently than minor or major aphthous ulcers . Recurrence may be so frequent that ulceration is virtually continuous . It generally occurs in a slightly older age group than the other subtypes , and females are affected slightly more frequently than males .

= = = RAS type ulceration = = =

Recurrent oral ulceration associated with systemic conditions is termed " RAS type ulceration " , " RAS like ulceration " , or " aphthous @-@ like ulcers " . Aphthous stomatitis occurs in individuals with no associated systemic disease . Persons with certain systemic diseases may be prone to oral ulceration , but this is secondary to the underlying medical condition ( see the systemic disease section ) . This kind of ulceration is considered by some to be separate from true aphthous stomatitis . However , this definition is not strictly applied . For example , many sources refer to oral ulceration caused by anemia and / or nutritional deficiencies as aphthous stomatitis , and some also consider Behçet 's disease to be a variant .

= = Treatment = =

The vast majority of people with aphthous stomatitis have minor symptoms and do not require any specific therapy . The pain is often tolerable with simple dietary modification during an episode of ulceration such as avoiding spicy and acidic foods and beverages . Many different topical and systemic medications have been proposed ( see table ) , sometimes showing little or no evidence of efficacy when formally investigated . Some of the results of interventions for RAS may in truth represent a placebo effect . No therapy is curative , with treatment aiming to relieve pain , promote healing and reduce the frequency of episodes of ulceration .

The first line therapy for aphthous stomatitis is topical agents rather than systemic medication , with topical corticosteroids being the mainstay treatment . Systemic treatment is usually reserved for severe disease due to the risk of adverse side effects associated with many of these agents . The application of glycerin , along with *Alchemilla vulgaris* , has also been shown to be effective in treating aphthous stomatitis . A systematic review found that no single systemic intervention was found to be effective . Good oral hygiene is important to prevent secondary infection of the ulcers .

Occasionally , in females where ulceration is correlated to the menstrual cycle or to an oral contraceptive , progestogen or a change in oral contraceptive may be beneficial . Use of nicotine replacement therapy for people who have developed oral ulceration after stopping smoking has also been reported . Starting smoking again does not usually lessen the condition . Trauma can be reduced by avoiding rough or sharp foodstuffs and by brushing teeth with care . If sodium lauryl sulfate is suspected to be the cause , avoidance of products containing this chemical may be useful and prevent recurrence in some individuals . Similarly patch testing may indicate that food allergy is responsible , and the diet modified accordingly . If investigations reveal deficiency states , correction of the deficiency may result in resolution of the ulceration . For example , there is some evidence that vitamin B12 supplementation may prevent recurrence in some individuals .

Surgical excision of aphthous ulcers has been described , but it is an ineffective and inappropriate treatment . Silver nitrate has also been used as a chemical cauterant . Apart from the mainstream approaches detailed above , there are numerous treatments of unproven effectiveness , ranging from herbal remedies to otherwise alternative treatments , including aloe vera , *myrtus communis* , *Rosa damascena* , zinc sulfate , nicotine , polio virus vaccine and prostaglandin E2 .

= = Prognosis = =

By definition , there is no serious underlying medical condition , and most importantly , the ulcers do

not represent oral cancer nor are they infectious . However , aphthae are capable of causing significant discomfort . There is a spectrum of severity , with symptoms ranging from a minor nuisance to disabling . Due to pain during eating , weight loss may develop as a result of not eating in severe cases of aphthous stomatitis . Usually , the condition lasts for several years before spontaneously disappearing in later life .

= = Epidemiology = =

Reported prevalence ranges from 5 ? 66 % , but in most populations , about 20 % of individuals are affected to some degree , making it the most common disease of the oral mucosa . Aphthous stomatitis occurs worldwide , but is more common in developed countries .

Within nations , there is a slightly higher prevalence in higher socioeconomic groups . Males and females are affected in an equal ratio , and the peak age of onset between 10 and 19 years . About 80 % of people with aphthous stomatitis first developed the condition before the age of 30 . There have been reports of ethnic variation . For example , in the United States , aphthous stomatitis may be three times more common in white @-@ skinned people than black @-@ skinned people .

= = History , society and culture = =

" Aphthous affectations " and " aphthous ulcerations " of the mouth are mentioned several times in the treatise " Of the Epidemics " ( part of the Hippocratic corpus , in the 4th century B.C ) , although it seems likely that this was oral ulceration as a manifestation of some infectious disease , since they are described as occurring in epidemic @-@ like patterns , with concurrent symptoms such as fever .

Aphthous stomatitis was once thought to be a form of recurrent herpes simplex virus infection , and some clinicians still refer to the condition as " herpes " despite this etiology having been disproven .

The informal term " canker sore " is sometimes used , mainly in North America , either to describe this condition generally , or to refer to the individual ulcers of this condition , or mouth ulcers of any cause unrelated to this condition . The origin of the word " canker " is thought to have been influenced by Latin , Old English , Middle English and Old North French . In Latin , cancer translates to " malignant tumor " or literally " crab " ( related to the likening of sectioned tumors to the limbs of a crab ) . The closely related word in Middle English and Old North French , chancre , now more usually applied to syphilis , is also thought to be involved . Despite this etymology , aphthous stomatitis is not a form of cancer but rather entirely benign .

An aphtha ( plural aphthae ) is a non specific term that refers to an ulcer of the mouth . The word is derived from the Greek word aphtha meaning " eruption " or " ulcer " . The lesions of several other oral conditions are sometimes described as aphthae , including Bednar 's aphthae ( infected , traumatic ulcers on the hard palate in infants ) , oral candidiasis , and foot @-@ and @-@ mouth disease . When used without qualification , aphthae commonly refers to lesions of recurrent aphthous stomatitis . Since the word aphtha is often taken to be synonymous with ulcer , it has been suggested that the term " aphthous ulcer " is redundant , but it remains in common use . Stomatitis is also a non @-@ specific term referring to any inflammatory process in the mouth , with or without oral ulceration . It may describe many different conditions apart from aphthous stomatitis such as angular stomatitis .

The current most widely used medical term is " recurrent aphthous stomatitis " or simply " aphthous stomatitis " . Historically , many different terms have been used to refer to recurrent aphthous stomatitis or its sub @-@ types , and some are still in use . Mikulicz ' aphthae is a synonym of minor RAS , named after Jan Mikulicz @-@ Radecki . Synonyms for major RAS include Sutton 's ulcers ( named after Richard Lightburn Sutton ) , Sutton 's disease , Sutton 's syndrome and paradenitis mucosa necrotica recurrens . Synonyms for aphthous stomatitis as a whole include ( recurrent ) oral aphthae , ( recurrent ) aphthous ulceration and ( oral ) aphthosis .

In traditional Chinese medicine , treatments for aphthae focus on clearing heat and nourishing Yin .

Rembrandt Gentle White toothpaste did not contain sodium lauryl sulfate , and was specifically

marketed as being for the benefit of " canker sore sufferers " . When the manufacturer Johnson & Johnson discontinued the product in 2014 , it caused a backlash of anger from long term customers , and the toothpaste began to sell for many times the original price on the auction website eBay .