

# Significance of Ferritin in Recurrent Oral Ulceration

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## ABSTRACT

**Background:** Ferritin is the storage form of iron. Hence, the sensitive test which can be used for diagnosing iron deficiency anaemia is estimation of ferritin in serum. One of the causative factors of oral ulceration is nutritional deficiency, which includes iron also.

**Aim:** To study the meaningful association between recurrent oral ulcer and ferritin.

**Materials and Methods:** Fifty oral ulcer cases which were diagnosed clinically in the ENT Department of Sree Balaji Medical College and Hospital and Twenty Five controls were included in this

study. Serum ferritin was estimated by doing a particle enhanced turbidimetric immunoassay for both cases and controls.

**Results:** Sixty six percent of cases had decreased ferritin values and 34% had normal values, which was significant.

**Conclusion:** From this study, it can be concluded that it is mandatory to screen oral ulcer patients for iron deficiency anaemia by estimating serum ferritin and it is also advisable for the patients to have iron supplementation on regular basis, along with diet rich in iron in addition to vitamins.

**Keywords:** Iron deficiency anaemia, Ferritin, Turbidimetric immunoassay

## INTRODUCTION

Ferritin is a globular protein which is present intracellularly, in which iron is stored in a soluble, non-toxic form. Basically, ferritin in the serum correlates with iron stores in the body. Ferritin can store up to 4,500 Fe (III) atoms. Apo-ferritin is the part of ferritin which is without iron. Apo-ferritin is made up of 24 polypeptide chains, each of which has a heavy subunit (H) and a light subunit (L). Iron transport is carried out by H subunit and iron storage in the liver and spleen is carried out by L subunit. Ferritin also transfers the iron from old red blood cells to apo-ferritin and immature cells in the bone marrow get their iron from transferring and this completes the cycle. Thus, iron homeostasis and its storage is maintained by ferritin. Henceforth, serum ferritin is most sensitive test for iron deficiency anaemia. Ferritin is low in this type of anaemia due to nutritional deficits, haemorrhagic loss (external or internal blood loss), hypothyroidism, vitamin C deficiency, coeliac disease, pure vegetarian diet, etc., [1,2]. Ferritin is high in chronic infection, chronic inflammatory bowel disease like ulcerative colitis, Crohn's disease, etc., chronic renal or hepatic disease, iron overload disorders like haemochromatosis, haemosiderosis, etc., Still's disease, porphyrias, acute inflammation, acute malnourishment, as ferritin is an acute phase reactant [3].

Oral ulcers are defined as ulcers that occur on the mucous membranes of the oral cavity. Such ulcers may be caused by nutritional deficiencies, local trauma, thermal and electrical burns, chemical injuries, irradiation, aphthous stomatitis, infections like Herpes labialis, chicken pox, HIV, etc., drugs like cytotoxic drugs, non-steroidal anti-inflammatory drugs, etc., [4].

Minor aphthous ulcerations are the most common ulcers which are present in iron deficiency anaemia. They usually present as small round/oval ulcers with a yellow-grey colour and erythematous "halos". They usually heal, with no permanent scarring and recurrences [5,6]. So, this study emphasized on the essentiality of the estimation of ferritin (which is sensitive test for diagnosing iron deficiency anaemia) in recurrent oral ulcers.

Females who usually take care of their family members ignore their health. Due to poor intake of iron, physiological loss like menstruation, worm infestations, etc, they are usually prone to develop iron deficiency anaemia, which leads to plummer Vinson syndrome and post cricoids carcinoma, thereby increasing the mortality rate. So, this study included only female patients, to create awareness among them on the essentiality of iron in their diet.

## MATERIALS AND METHODS

This case control study included 50 positive cases of oral ulcers which were diagnosed clinically in the ENT Outpatient department OPD of Sree Balaji Medical College and Hospital and 25 normal healthy controls. This study was approved by the institutional ethical committee. All the patients with known histories of hypothyroidism, vitamin deficiency, coeliac disease, ulcerative colitis, Crohn's disease, haemochromatosis, haemosiderosis. Still's disease, chronic renal or hepatic diseases, acute malnourishment, chronic infections, acute inflammation, porphyrias, were excluded from this study.

Serum samples were collected from oral ulcer patients and from healthy individuals by venipuncture under aseptic precautions, after getting written informed consents from them. Serum ferritin was estimated by doing a particle enhanced turbidimetric immunoassay in both the oral ulcer patients as well as in healthy individuals. The assay was done by using CRM Diagnostics and a Semi-automated analyzer.

## RESULTS

[Table/Fig-1,2] show the study data.

Overall observations were:

- Decreased: 66% cases
- Within normal limits: 34% cases
- Normal: control group members

Group	Age in years		Total	Chi-Square Test	p-value
	20-30	30-40			
Case	27	23	50	.027	.534
Control	14	11	25		
Total	41	34	75		

[Table/Fig-1] denotes out of 75,50 cases & 25 controls were included in the study

Group	Low ferritin	Normal ferritin	Total	Chi-Square Test	p-value
Case	33	17	50	29.464	0.000 Significant
Control	0	25	25		
Total	33	42	75		

[Table/Fig-2] 66% of oral ulcer patients had low ferritin level which is significant

## DISCUSSION

The present study revealed decrease in serum ferritin in recurrent oral ulcerations and levels correlated with disease activity, Henceforth, this abnormality may serve as a marker of recurrent oral ulcers. This statement was supported by Challacombe S.J.et al., [7]. In his study, he suggested that oral ulcerations may be a presenting sign of iron deficiency. This was a case control study done on oral ulcer patients who attended the ENT OPD of Sree Balaji Medical College and Hospital, Chennai, India.

Generally, physicians thought that nutritional deficiency caused by vitamin deficits caused recurrent oral ulcers. The study done by Nolan A et al., revealed that recurrent oral ulcers may be caused by vitamin deficiency [8]. But this study proved that one of the causative factors of recurrent oral ulcerations, particularly in females, was iron deficiency anaemia. A similar statement was made by Porter SR et al., [9], which was supported by JS Renne et al., [10]. He mentioned in his study that negative iron balance led to depleted iron stores which caused epithelial atrophy. According to his study, oral ulcerations were the most common disease which was caused by epithelial atrophy caused by iron deficiency.

In this study, only female subjects were selected, because nutritional deficiency caused by iron was most common in females in India. In contrast to this study, Nabih Farasat Khan et al., in his study, proved that both the sexes showed low Hb levels in aphthous stomatitis [11]. According to Roger RS and Hutton there was equal prevalence of recurrent oral ulcerations in both the sexes [12].

Age group of 20-40 years was selected. This was the reproductive age group which was more prone to iron deficiency anaemia This study included more of the patients and healthy individuals who were in the age group of 20-30 years, which was the child bearing age in which iron deficiency anaemia was caused due to inadequate iron supplementation. But in many studies, the age group selection was insignificant.

Regulation of ferritin synthesis was achieved by intracellular iron at both the transcriptional and translational levels. Low iron levels lead to reduced ferritin synthesis. Iron regulates the synthesis of ferritin post transcriptionally. Inhibition of the translation of ferritin mRNA is done by the binding of iron regulatory proteins, IRP1 and IRP2 to

the stem-loop structure of iron responsive element (IRE) which is present at the 5' end of the heavy and light chain ferritin mRNA. This study revealed a positive correlation between serum ferritin levels and recurrent oral ulcerations [13,14].

In our study, it was proved that serum ferritin, sensitive index of iron deficiency anaemia, was decreased in 66% of the oral ulcer female patients, which reflected the prevalence of iron deficiency anaemia. The same conclusion was given by Challacombe SJ et al., Nabih Farasat Khan et al., in their studies [7-11]. But Roger RS et al., in his study, revealed that recurrent oral ulcerations caused by haematinic deficiency were only 20% [12].

This study thereby correlated recurrent oral ulcerations with iron deficiency anaemia, through estimation of serum ferritin levels in both the patients and the controls. This study was supported by Wray D et al. In his study, he insisted on a need for haematological screening of all the oral ulcer patients, which was similar to that done in my study [1].

## CONCLUSION

In this study, it was concluded that one of the causative factors of oral ulcers was iron deficiency anaemia and this has to be brought into the knowledge of the patients as well as physicians. Screening oral ulcer patients by doing serum ferritin estimations is necessary, so that iron deficiency anaemia, which is one of the causes of recurrent oral ulcers cannot be ignored. It is also essential for oral ulcer patients to have nutritional diet containing iron, along with vitamin and iron supplementations whenever they are necessary.

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FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Aug 26, 2013**  
Date of Peer Review: **Nov 12, 2013**  
Date of Acceptance: **Jan 17, 2014**  
Date of Publishing: **Mar 15, 2014**