INTRODUCTION
Dental Caries is a disease of great concern which affects people of all races in all places. History suggests that caries was not a disease with high prevalence until the 17th century. The reason can be attributed to the large consumption of fermentable carbohydrates in the form of sucrose for the last three centuries. The 20th century saw the establishment of Dentistry as a profession. Throughout the beginning of the century the profession mainly dealt with relieving pain to people by surgical intervention. It was only after Stephan 1942 demonstrated a sudden drop in the Hydroxyapatite crystal resulting in caries. The reason ultimately, the calcium and Phosphate ions diffuse out from Microorganisms to saliva to diet. Whatever may be the anomaly or any other deformity were excluded. Elimination of microbial growth was achieved by using an autoclave cycle for 40 minutes. Teeth that do not contain amalgam restorations were preferred because they can be safely autoclaved. However, Extracted teeth containing amalgam restorations, were immersed in 10% formalin solution for 2 weeks.

Research has proved that the rate of dissolution of Hydroxyapatite greatly increases below the pH 5.5, however the dissolution is not instantaneous and is dependent on the amount of exposure of the Hydroxyapatite crystal to the acidic environment. Hence the present study was designed to assess the calcium release from intact enamel when subjected to different pH at different time intervals.

MATERIALS AND METHODS
Freshly extracted human Maxillary and Mandibular first molar teeth extracted on periodontal grounds from individuals below the age of 40. Teeth were selected based on randomized sampling method. Teeth with caries, hypoplastic lesions, stains, white spots, cracks, erosion, developmental anomaly or any other deformity were excluded. The teeth were cleansed of visible blood and gross debris and were maintained in a hydrated state during storage. Extracted teeth were placed in sodium hypochlorite solution diluted with saline in a ratio of 1:10 in container with a secure lid to prevent leaking and labeled with the biohazard symbol.

Elimination of microbial growth was achieved by using an autoclave cycle for 40 minutes. Teeth that do not contain amalgam restorations were preferred because they can be safely autoclaved. However, Extracted teeth containing amalgam restorations, were immersed in 10% formalin solution for 2 weeks. Seven Enamel slabs of 2mm thickness were prepared from Buccal and Lingual surface of molars by using diamond discs under water cooling at a speed of 25,000 RPM using Micromotor with a contra angled hand piece. The surface of enamel on the buccal and lingual surface were first made flat and then polished to get a fine gloss using 3M Sof-Lex polishing discs(J of American Science, 2010;6(11)).

EFFECT OF PH AND TIME ON CALCIUM RELEASE FROM SOUND ENAMEL: AN ATOMIC SPECTROMETRIC ANALYSIS
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ABSTRACT
Dental Caries is a disease of great concern which affects people of all races in all places, the exact etiology of caries though unknown; it is well established that the release of calcium and phosphate from hydroxyapatite crystal is due to decreased pH of saliva. However the relationship between calcium release, pH and time is not well documented.

The present study was designed to assess the calcium release from intact enamel when subjected to different pH at different time intervals. The enamel samples were subjected to acid challenge using Acetate buffer of pH of 3.5, 4.5, 5, 5.5, 6 and 6.5 and buffer solution were analyzed for calcium release at specific time intervals for each pH using atomic absorption spectrometry. The results show that the rate of calcium release significantly increased from pH 5.0 to 5.5, however the calcium release was very little in pH 5.5 to 6.5. From the observations made from this study we can conclude that sound enamel is resistant to acid attack between pH of 5 to 5.5 and Time plays an important role in the reaction of enamel to acid.

Keywords: Caries, Sound enamel, Calcium, demineralization, pH, time.
Samples were prepared following all infection control protocols and barrier techniques. 0.2 M Acetate buffer was prepared for pH 3.5 to 6.5 at 0.5 intervals. The samples of Intact Enamel were divided into seven subgroups each based on the pH of Acid buffer. Individual specimen of every subgroup was immersed in 50 ml of acetate buffer. The solution was continuously stirred using a magnetic stirrer at 100 RPM. 5 ml of the solution was poured to a sterile screw capped tubes at time intervals of 0, 0.5, 1, 5, 10, 15, 30 and 60 minutes using a micro pipette. All the centrifuge tubes were marked for future identification. The experiment was simultaneously conducted for all the 4 groups. The acid buffers of all the groups for all time intervals were evaluated for calcium, using Atomic spectrometry (GBC 932 Plus atomic absorption spectrophotometer). All the Experimental data were analyzed using one way ANOVA.

RESULTS
Enamel samples treated with Acetate Buffer showed increased amount of calcium release at all time intervals between pH 3.5-5.0. However calcium release was statistically not significant above pH 5.0 at all time intervals. There was statistically significant amount of calcium release at time intervals of 15, 30 and 60 mins compared to time intervals below 15mins.

DISCUSSION
Dental caries is a dynamic process involving periods of demineralization and remineralization. When demineralization is greater than remineralization the lesion progresses. The increased demineralization is attributed to decreased pH of oral fluids.

The present study was designed to assess the calcium release from intact enamel when subjected to different pH at different time intervals. The rate of calcium release significantly increased from pH 5.0 to 3.5, however the calcium release was very little in pH 5.5 to 6.5. This may be because when pH is below 5.5 Hydroxyapatite dissolves in the saliva because the saliva is under saturated with hydroxyapatite, hence Sound Enamel is resistant to acid attack above pH 5.5. 1 Measurements of pH have made it possible to examine dental plaque as a metabolic unit and to identify the Stephan pH response as an important indicator of caries activity7. The results obtained indicates that along with the pH, This study showed that the calcium release proportionately increased with time in all pH groups, suggesting that the time also plays an important role in caries formation. Sound enamel is resistant to acid attack between pH 5.0-5.5 but it showed vulnerability to lower pH. Time plays an important role in the reaction of enamel to acid. However there is no pre-determined demarcation of time or amount of calcium released to distinguish the acid resistance of enamel.

CONCLUSION
Sound enamel is resistant to acid attack between pH 5.0-5.5 but it showed vulnerability to lower pH. Time plays an important role in the reaction of enamel to acid. However there is no pre-determined demarcation of time or amount of calcium released to distinguish the acid resistance of enamel.

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