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Prospective Comparative Study To Determine The Risk Of Syncope In A Dental Chair In Supine Position During Administration Of Local Anesthesia

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ABSTRACT
This study compared how often patients fainted (**syncope**) when getting local anesthesia. It looked at two body positions: lying flat (**supine position**) versus partly sitting up (**semi-supine position**). This happened during dental surgery for tooth extractions among local people.

Materials and Methods
Fifteen patients needing tooth extraction were in this study. Patients were put into two groups. Group A patients received local anesthesia while lying flat. In this position, the patient's head and heart were at the same level. Group B patients received local anesthesia while partly sitting up.

Results
One hundred patients needed tooth extraction with local anesthesia. A few patients (**15%**) treated lying flat showed signs of almost fainting (**presyncope**). Most patients (**75%**) in the semi-supine position (Group A) had signs of presyncope. The difference was significant in the statistics. No patient lost consciousness in the supine position (Group B) in this study.

Conclusion
It was concluded that fainting was easy to stop. This happened if all patients were placed lying flat beforehand.

Key words: Vasodepressor syncope, Dental chair position, Local anesthesia, Complications of local anesthesia.

Introduction
Okay, I've got this. I'll take all your instructions from before—sounding like an Indian high school student writing a formal research paper, no first person, no high-end vocab, commas only for lists, and all the other specific style points—and apply them to this new content about syncope.
Here's the rephrased content:
Syncope is a brief loss of consciousness. It also causes a loss of body control, usually leading to a fall. This happens because the brain temporarily does not get enough blood. Syncope is the most common medical emergency in a dental office. It makes up over **60%** of emergencies there. It often happens before, during, or right after local anesthesia is given. Many things can lead to syncope. Some are psychological, like **fright, anxiety, emotional stress, bad news, sudden severe pain, or seeing blood or dental tools**. For example, seeing a local anesthetic injection can cause it. Other things are not psychological. These include **standing or sitting upright for too long in a dental chair, missing meals, hunger from dieting, tiredness, poor physical health, or a hot, crowded environment**. Being male and between **16 and 80 years old** can also be factors.
The patient's position in the dental chair is a very important factor for **vasodepressor syncope**. Patients getting dental treatment receive local anesthesia in a **supine** (lying flat) or **semi-supine** (30 to 45-degree) position. Syncope usually happens when a person is upright. However, it can also happen when a patient is lying flat or sitting in the dental chair.
Syncope can be easily prevented. This means getting rid of the things that cause it. Good room ventilation helps. Controlling room temperature helps. Having a light snack or meal before dental appointments helps. Proper patient

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positioning and reducing anxiety are also important. Also, crossing legs and tensing muscles, used as a simple physical action when early symptoms start, can delay or stop **vasovagal syncope**.
Today, patients around the world are treated lying flat or partly sitting up. This practice has reduced the chances of syncope in the dental chair. However, this is not always true in one country. There, most patients are still treated sitting upright. No information is known about how often syncope happens in the dental chair for patients visiting different dental hospitals or clinics.
Syncope is a harmless process. It usually goes away on its own without medical help. Losing body control and eventually falling is a natural protection. It helps bring blood back to the brain if it was stopped. Without this, death could happen. This was seen in people forced to stay upright during crucifixion.
Medical emergencies happen most often during and after local anesthesia. They also happen during tooth extraction or **endodontics**. **Sixty percent** of these emergencies were syncope. **Hyperventilation** followed next. Syncope is the most common medical emergency seen by dentists. It makes up about **50%** of all reported emergencies during dental practice. **Vasovagal syncope** was the most frequent emergency reported. Other common emergencies were **hypoglycemia, angina, epileptic fit, choking, asthma, hypertensive crisis, and anaphylaxis**. The patient's position in the dental chair is the most important factor in **vasodepressor syncope**. Patients getting dental treatment receive local anesthesia while lying flat or partly sitting up (30 to 45 degrees). Syncope usually develops when a person is upright. However, it can also happen when a patient is lying flat or sitting in the dental chair.

Giving a local anesthetic injection while the patient is lying flat minimizes the risk of syncope in the dental chair. When the patient is lying flat, gravity acts equally across the whole body. Blood flows more easily from the heart to the brain. In a semi-supine position, the top blood pressure number (**systolic blood pressure**) drops by **2mmHg** for every inch the patient's head is above the heart. No patient in this study fainted while lying flat or after being placed in a lying flat position. Fright and anxiety are known psychological factors that can cause syncope. Yet, no patient fainted after getting local anesthetic while lying flat.

Materials and methods
Fifty healthy patients needing tooth extraction took part in this study. Patients were put into two groups. In **Group A**, patients received a local anesthetic injection while lying flat (**supine position**). This meant the patient's head and heart were at the same level. In **Group B**, local anesthesia was given in the **semi-supine position**.
One hundred patients needed tooth extraction with local anesthesia. It was observed that a small number of patients (**15%**) treated in the supine position showed signs of almost fainting (**presyncope**). They had high anxiety levels, fast heart rates, and fear of the injection. However, most patients (**75%**) in the semi-supine position had presyncope symptoms. The difference between the groups was statistically significant.

Results
There were 76 males (76%) and 24 females(24%). All patients were healthy and their age ranged from 15 to 80 years .). More than three quarters of the patients(76%) had no fear Majority of the patients wore loose clothes while a few patients with tight clothes including scarf or shawl .Among 100 patients included in there were 76 males (76%) and 24 females (24%). These Patients were administered local anesthesia in supine position. 100 patients included 76 males (76.%) and 5 females (24%). They were administered local anesthesia in a semi-supine chair position. All patients with pre-syncope symptoms were immediately placed in supine position except those who were already in supine position and were kept as such, there clothes were loosened and were asked to take deep breaths, practice leg crossing and muscle tensing while they were being reassured till complete resolution of symptoms. All Patients recovered completely in 2-3 minutes. None of the patients lost consciousness once placed in supine position.

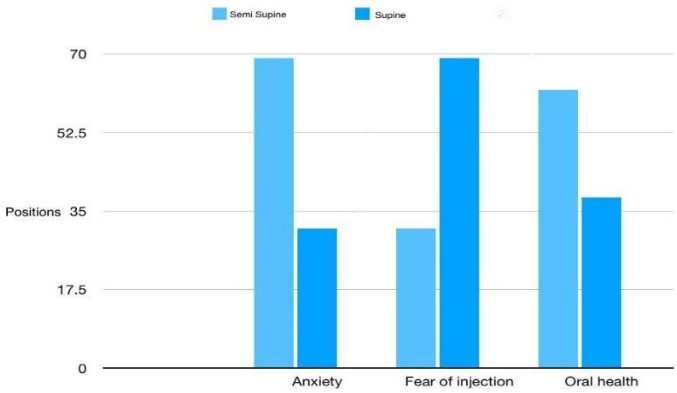

Figure- 1 Bar chart represents the association between positions and parameters of syncope . X-axis represents positions and Y-axis represents the percentage of response .

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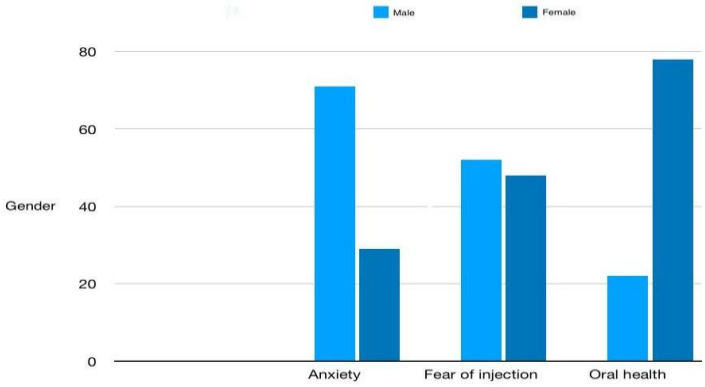

Figure- 2 Bar chart represents the association between gender and parameters of syncope. X-axis represents gender and Y-axis represents the percentage of response .

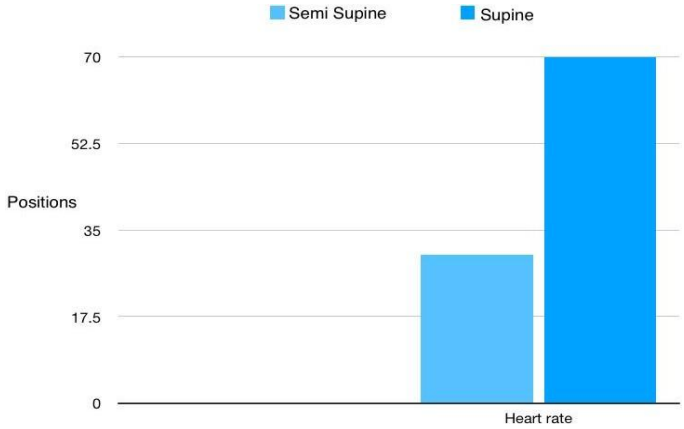

Figure-3 Bar chart represents the association between positions and heart rate . X-axis represents positions and Y axis represents the percentage of response.

Discussion

Syncope represents the most frequently encountered medical emergency within dental practice environments. It accounts for a substantial proportion, ranging from 50% to 60%, of all emergencies that dentists manage. Although syncope is observed more often in adult patients, its occurrence is also possible within pediatric dental settings. This is because adult guardians commonly accompany all young dental patients during their appointments. Syncope itself results from a complex physiological response, often described as a "fight or flight" mechanism. When this response is triggered without corresponding patient muscular movement, a temporary loss of consciousness occurs. This condition is most prevalent among young adults, particularly those between the ages of 16 and 35 years. Furthermore, a higher incidence has been noted in men compared to women. This difference may be related to societal expectations, where males might feel pressure to endure stressful situations without openly expressing fear or discomfort. In contrast, pediatric patients rarely develop syncope. Their emotional and physical reactions to stressful situations are usually overt, meaning they do not suppress their fears.

If a pediatric patient experiences syncope, or if an adult patient over 40 years exhibits syncope without clear predisposing factors, a referral for a medical consultation is warranted. This ensures any underlying health issues are identified. Vasovagal syncope (VVS), commonly known as a common faint, is a neurally mediated syndrome. It is associated with a drop in blood pressure (hypotension) and a relatively slow heart rate (bradycardia). These symptoms arise from a temporary reduction in blood flow to the brain (cerebral hypoperfusion), typically exceeding a 20% decrease. The early clinical signs, often termed presyncope, include a pale appearance of the face, increased sweating, feelings of nausea, and a sensation of warmth. This phenomenon frequently occurs when a patient is kept in an upright position for an extended duration. It also happens when patients are exposed to emotional stress, experience pain, or are in medical environments. Vasovagal syncope can manifest across all age groups.

Predisposing factors for syncope can be systematically categorized into two main groups: psychogenic factors and non-psychogenic factors.

Psychogenic factors encompass a range of emotional and psychological triggers. These include fright, which is a sudden intense fear. Anxiety also plays a significant role, often arising from the anticipation of discomfort during a procedure or concerns about the financial fee. General stress contributes to the risk. Receiving unwelcome news, perhaps concerning a

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diagnosis or the cost of treatment, can act as a trigger. Experiencing sudden and unanticipated pain, such as from an injection or during a treatment procedure, is another psychogenic factor. The mere sight of blood, whether on gauze or on dental instruments, can also initiate a syncopal episode. For instance, a parent with a history of negative dental experiences, accompanying their child for an emergency dental extraction, who is informed of the treatment fee and stands observing the extracted tooth in blood-soaked gauze from the treatment room doorway, represents a prime candidate for developing syncope due to these combined psychogenic stressors.

Non-psychogenic factors relate to physical or environmental conditions. Sitting in an upright position for too long, especially during an injection, or maintaining immobility while standing, can cause blood to accumulate in the peripheral extremities, like the arms and legs. This pooling reduces the flow of blood returning to the brain. Hunger resulting from dieting or missed meals leads to decreased glucose supply to the brain, which can also trigger syncope. Other non-psychogenic factors include exhaustion, poor overall physical condition, and exposure to hot, humid, or crowded environments.

The physiological mechanism behind the onset of syncope involves a series of bodily responses. Stress leads to the release of increased amounts of catecholamines, such as epinephrine and norepinephrine, into the circulatory system. These hormones prepare the individual for increased muscle activity as part of a "fight or flight" reaction in a threatening situation. The body's responses to this catecholamine release include a decrease in peripheral vascular resistance and an increase in blood flow directed towards the peripheral skeletal muscles. If actual muscle activity occurs, such as running or fighting, the increased blood volume diverted to the muscles is effectively returned to the heart. However, if muscle activity does not occur, for instance, when an individual is sitting or standing still, there is increased pooling of blood in the extremities. This results in a decreased return of blood to the heart. Consequently, there is a reduction in the circulating blood volume, a drop in overall arterial blood pressure, and diminished blood flow to the brain, ultimately leading to syncope. Failure to timely manage the body’s compensatory mechanism for this decreased circulatory volume can lead to several severe outcomes. These include reflex bradycardia, which is a dangerously slow heart rate, decreased cardiac output, meaning the heart pumps less blood, a further drop in blood pressure, cerebral ischemia which is insufficient blood flow to the brain, and in some cases, even convulsions.

The clinical presentation of syncope can be categorized into distinct early and late stages based on the observed signs and symptoms. In the early stage, the patient typically expresses a feeling of warmth. They often exhibit a loss of natural skin color, presenting with an ashen-gray skin tone. Heavy perspiration is common. Patients might report a general sensation of "feeling bad" or "feeling faint." They may also report feeling nauseous. During this early phase, objective signs may include a slightly lower blood pressure and a faster heart rate, known as tachycardia. As syncope progresses to the late stage, the patient begins to exhibit pupillary dilation. Yawning often occurs. Their breathing may become fast and deep, a condition called hyperpnea. Their extremities, such as hands and feet, may feel cold. There is a noticeable drop in blood pressure (hypotension) and a slowing of the heart rate (bradycardia). Visual disturbances might be reported, along with dizziness. Ultimately, these symptoms culminate in a loss of consciousness.

Emergency Management of Syncope

The most fundamental step in the management of syncope is its prevention. This is achieved through several proactive measures. A thorough medical and dental history must be obtained from every patient. This helps to identify any predisposing factors that might contribute to a syncopal episode. Such factors include a previous history of syncope, an expressed fear of dental treatment possibly due to prior traumatic dental experiences or pain, and instances of low blood sugar (hypoglycemia). For patients, particularly those who exhibit anxiety, it is advisable that they consume a light meal prior to their dental appointment. This helps maintain a stable blood glucose level throughout potentially stressful treatment. Patients should ideally be treated in either a supine position (lying flat) or a semi-supine position (tilted back 30-45 degrees), especially during the administration of local anesthetic injections. Furthermore, considering the use of anxiety-reducing techniques is important. These techniques may include premedication, which involves giving medicine before treatment, and nitrous oxide anxiolysis, where gas is used to lessen anxiety.

Should a patient experience syncope despite preventative measures, immediate and specific steps must be taken for emergency management. First, all ongoing dental treatment must be stopped without delay. Next, the patient's level of consciousness must be assessed by evaluating their lack of response to sensory stimulation. The office emergency system should be activated. This involves calling for assistance and ensuring that oxygen and the emergency drug kit are brought to the location of the emergency. The patient must then be carefully positioned; they should be placed in a supine position with their feet elevated slightly. Airway and circulation assessment is critical. This involves checking the patient's breathing and ensuring the airway is clear. The head and jaw position should be adjusted accordingly. The patient's pulse and blood pressure must be continuously monitored.

Definitive care should then be provided. One common measure is the administration of aromatic ammonia ampoules. The ampule is crushed between the fingers and positioned under the patient's nose. The irritating fumes from the ammonia

stimulate movement of the extremities, which helps in the return of blood from peripheral areas back to the heart and brain. It is also important to consistently observe for prodromal symptoms like sweating, dizziness, and paleness. When these symptoms appear, physical counterpressure maneuvers, such as leg crossing and arm tension, should be advised to the patient. When syncope occurs, the patient should be placed immediately in a supine position with their legs raised, or in a side-lying position, and oxygen should be administered at a rate of 15 liters per minute. It is essential that an oxygen cylinder along with appropriate masks or Ambu bags are readily available in every dental practice for such emergencies. Simulation courses are highly advised for dental professionals to enhance their skills in diagnosing and treating medical emergencies. Taking a thorough medical history that pays special attention to any previous episodes of fainting is also necessary. Finally, it is crucial to explore the patient's past experiences and fears and to invest in building a trusting relationship with them.

For Post-Syncopal management, specific protocols are followed. If the patient recovers consciousness and normal vital signs in less than 15 minutes, further dental treatment should be postponed for that day. However, if recovery is delayed by more than 15 minutes, emergency medical services (EMS) should be contacted immediately. Definitive care for the patient must continue until trained emergency care providers arrive. After the episode, it is essential to determine the precipitating factors that caused the syncope. This could include anxiety, the sight of blood, unexpected pain, or low blood sugar.

Conclusion

It was concluded that syncope was easy to prevent if all patients were placed supine beforehand.Syncope is the most common emergency in dental practices. Nonetheless, the vast majority of dentists do not seem competent nor prepared to manage this emergency. Psychogenic factors seem to play an important role in provoking syncope. Placing the patient in a supine reclined position with raised legs in combination with the administration of oxygen seems effective for regaining consciousness. Although valuable in many aspects, risk assessment by medical history taking is not proven to result in fewer episodes.

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