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"Iatrogenic" Failures in Prosthodontics- A Review

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ABSTRACT: In prosthodontics, iatrogenic failures are problems or unfavorable results brought on by mistakes made in the design, manufacture, placement, or planning of prosthetic devices. Problems including poor fit, discomfort, functional limits, aesthetic difficulties, and, in extreme situations, implant or prosthesis failure can result from these failures, which can impact both fixed and removable prosthodontics as well as implant and maxillofacial prosthetics. Iatrogenic failures can be caused by a variety of factors, such as inaccurate diagnosis, poor material selection, misplaced implants, and insufficient patient care. Changes in hard and soft tissues brought on by prosthetic stress or healing also have a big impact. The significance of careful pre-treatment planning, the application of cutting-edge imaging technology, precise imprint processes, and personalized prosthetic designs are highlighted in the solutions to these problems. Improving prosthetic results requires the use of cutting-edge materials and retention systems, as well as ongoing patient monitoring and prompt changes. An overview of numerous iatrogenic failures in various prosthodontic specialties will be given in this study, together with an analysis of the underlying causes and evidence-based recommendations for mitigating these issues and improving the overall efficacy of prosthodontic therapies. As such no literature is available exclusively on the iatrogenic failure of prosthodontic treatments. Hence this review article provides a road map for comprehending and resolving the problems in prosthodontics by highlighting the characteristics of iatrogenic failures, their causes, and potential remedies.

KEY WORDS: Iatrogenic Failures; Fixed Prosthodontic Failures; Conventional Prosthodontic Failures.

I. INTRODUCTION

In prosthodontics, issues or complications that develop as a result of a prosthodontist's therapy or intervention are referred to as iatrogenic failures. Numerous things, such as mistakes in diagnosis, planning, material selection, technique, or patient care, might lead to these failures. The following are a few typical prosthodontic iatrogenic failures: [1-4]

1. Inadequate Fit for the Prosthesis: Causes include inaccurate lab work, poorly prepared teeth, or inaccurate impressions. Consequences include pain, discomfort, trouble speaking and chewing, and possible harm to the supporting tissues (soft tissues, remaining teeth, etc.).

2. Failures of Materials: Causes include the use of inferior or incorrect materials and mistakes made while choosing materials for certain purposes (such as strength or appearance). Consequences include wear, discolouration, allergic reactions, or prosthesis fracture (particularly with specific metals or acrylics).

3. Occlusal Issues: Causes: Incorrect bite occlusion brought on by mistakes in mounting, bite registration, or occlusal modifications. Consequences include excessive wear on the prosthesis or natural teeth, temporomandibular joint (TMJ) abnormalities, or uncomfortable or ineffective chewing.

4. Not Practicing Good Oral Hygiene: Causes include improper maintenance procedures and inadequate patient education. The accumulation of plaque and tartar can result in gum disease, cavities, peri-implantitis, and failure of the prosthesis.

5. Using the wrong diagnosis or treatment plan: Causes: Ignoring underlying problems such as bone loss, malocclusion, or periodontal disease by failing to perform a thorough evaluation of the patient's oral health. Consequences include poor functional or cosmetic results, misaligned or poorly fitting prostheses, or a worsening of preexisting problems.

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6. Prosthetic Retention Failure: Causes: Inaccurate impression processes, inadequate cementation, or inadequate retention design. Consequences include discomfort and even harm to the remaining structures if the prosthesis breaks loose or slips out.
7. Too Much Tooth Preparation: Causes: When making crowns or bridges, natural teeth are overprepared.
Consequences include endodontic (root canal) issues, weakened tooth structure, and an elevated risk of tooth fracture.
8. Endodontic Failures: Causes include inadequate root canal therapy or a failure to identify the necessity of root canal therapy prior to prosthesis placement. Consequences include tooth loss, prosthetic failure, or infection or inflammation.
9. Incorrect Implant Positioning: Causes: Inaccurate measurements of depth, angulation, or bone structure made during placing dental implants. Consequences include implant failure, nerve injury, implant breakage, or prosthesis misalignment.
10. Failures in Aesthetics; Causes include inadequate design, improper shade matching, or a failure to recognize the patient's aesthetic requirements. Repercussions include an unnatural look, discontent, and the requirement for revisions or remakes.
11. Damage to Soft Tissue: Causes include improper gingival handling during tooth preparation, inappropriate abutment shape, or uncomfortable prosthetics. Repercussions include ulceration, tissue irritation, or gingival recession.
12. Prosthetic Fracture: Causes include incorrect design (e.g., weak areas), poor material selection, or overloading the prosthesis. Consequences include crown, bridge, or denture fracture or chipping, which can cause both functional and cosmetic issues.
13. Denture overextension: Causes: Excessive borders or poorly made denture flanges. Consequences include discomfort, impaired memory, mucosal irritation, or trouble speaking and chewing.
14. Infection Following Surgery: Causes: Failure to manage bacterial contamination during surgeries, inadequate sterilization, or inadequate postoperative care. Consequences include prosthesis failure, pain, swelling, and abscess formation.
15. Ignoring Parafunctional Behaviors: Causes: During treatment planning, bruxism (teeth grinding) and clenching were not taken into consideration. Consequences include occlusion misalignment, prosthesis wear or damage, and restorative work failure.
16. Overloading an Implant or Prosthesis: Causes include using too much force when biting or positioning a prosthesis without taking the patient's bite force or load distribution into account. Consequences include implant failure or prosthesis fracture.
17. Inadequate Aftercare; Causes: Absence of routine examinations or inadequate follow-up following prosthesis placement. Consequences: If problems are not identified early, they could cause failure or long-term damage.
Thorough evaluation, meticulous planning, precise treatment execution, and appropriate patient communication regarding expectations and care needs can frequently avert iatrogenic failures in prosthodontics.

I. A variety of iatrogenic issues with removable prosthodontics: causes and remedies
Errors in diagnosis, treatment planning, or prosthesis manufacture are examples of iatrogenic failures in removable prosthodontics, which are problems or failures that come from the prosthodontist's therapy. The patient's comfort, functionality, and general contentment with the prosthetic device can all be greatly impacted by these malfunctions. The following list of iatrogenic failures unique to removable prosthodontics includes explanations, fixes: [1, 5,6]
1. Inadequate Denture Fit and Retention
Inaccurate Impressions: Inadequate or subpar impressions might lead to improperly fitting dentures. Poor Anatomical Landmarks: When creating impressions, landmarks are not sufficiently recognized. Inaccurate Jaw Relationship: Retention may be impacted by improper bite registration or a flawed occlusal vertical dimension.
Repercussions:
pain and decreased chewing efficiency due to retention and stability issues.
oral ulcers brought on by improperly fitting dentures.
Solution:
Better Impression Methods: To better capture anatomical details, use precise, premium impression materials and methods such as selective pressure.
Jig or Custom Trays: For more precise impressions, use custom trays.
Vertical Dimension Reassessment: Verifying the proper vertical dimension when registering a bite.

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2. Excessive Denture Border Extending

Causes:

Inappropriate Border Molding: Excessive border extension during the imprinting process may result in tissue inflammation, pain, or irritation.

Inadequate Wax Try-in: The try-in phase may not accurately depict the required fit and borders.

Repercussions:

discomfort and irritation of the mucosa and gingiva, which are soft tissues.

difficulty masticating and speaking.

Solutions:

Proper Border Molding: To guarantee adequate extension without going overboard, use the right border molding procedures.

During the wax try-in phase, make sure the patient is at ease with the borders and make any necessary adjustments before final processing.

3. Soreness in Dentures and Inflammation of the Mucosa

Causes:

Badly Fitting Dentures: Excessive pressure on mucosal tissues might result from a poor fit brought on by erroneous impressions or modifications.

Inadequate modifications: Soreness and inflammation may result from neglecting to make the required modifications once the patient begins wearing the denture.

Repercussions:

tissues that are painful or irritated, which makes it challenging for the patient to wear dentures on a regular basis.

elevated risk of fungal infections and denture stomatitis.

Answers:

Follow-up and changes: Following the initial denture placement, routine follow-up appointments are required to make any necessary changes. Using tissue conditioning products or relining the denture to relieve pressure spots is known as pressure relief.

4. Vertical Dimension of Occlusion (VDO) Excessive

Causes:

Inaccurate Bite Registration: An inaccurate vertical dimension may result from mistakes made during the bite registration procedure. Not taking into consideration the patient's natural occlusion or the loss of vertical dimension brought on by tooth loss is known as failing to assess the patient's existing vertical dimension.

Repercussions:

discomfort, trouble speaking, and decreased effectiveness of chewing. temporomandibular joint (TMJ) problems and muscle strains.

Answers:

Accurate VDO Determination: Identifying the optimal VDO by clinical techniques such as patient feedback and facial measurements.

Wax Try-in Stage: Prior to processing, make sure that the wax has the right occlusion and VDO.

5. Fractures of Dentures

Causes:

Using inferior or brittle materials (such as cheap acrylic) is an example of an inadequate material choice.

Inadequate Design: Absence of support in vital places, such as the palate or molar regions. Dropping dentures or applying too much stress to thin denture sections are examples of overloading or improper handling.

Repercussions:

Unusable broken dentures that need to be repaired or recreated. fractures that could make a person look unattractive.

Answers:

Selecting high-quality materials and reinforcing important sections are examples of reinforcement and material selection. Teaching patients how to properly handle their dentures in order to prevent fractures is known as proper handling and education.

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6. Aesthetically incorrect appearance

Causes:

Inaccurate Tooth Shade Matching: Selecting tooth forms and hues that are not acceptable for the patient's real teeth.

Ignorance of Patient Preferences: Insufficient comprehension or evaluation of the patient's aesthetic preferences.

Repercussions:

unnatural-looking dentures, which may have an impact on the patient's prosthetic satisfaction and sense of self.

Answers:

Aesthetic Consideration: Having in-depth conversations with patients to ascertain their preferences and choosing tooth forms and tints appropriately.

Try-in Phases: Using try-ins to confirm that the patient is satisfied with the appearance.

7. Insufficient Patient Education and Aftercare

Causes:

Absence of Maintenance Instruction: The patient was not adequately instructed on correct denture care and hygiene procedures.

Poor Follow-Up Visits: Not making sure that after the initial fitting, the right care or adjustments are given.

Repercussions:

poor oral hygiene, a higher chance of denture stomatitis, and the potential for denture failure. increased prosthesis wear and tear.

Answers:

Patient education: Detailed guidelines for handling, maintaining, and cleaning dentures.

Frequent Follow-up: Arranging follow-up appointments to evaluate the dentures' state and guarantee patient comfort.

A number of problems, such as inadequate patient care, poor fit, incorrect material selection, and occlusion errors, can lead to iatrogenic failures in removable prosthodontics. These failures can be reduced by comprehending the reasons and putting remedies in place, such as improved material selection, precise diagnosis, appropriate patient education, and routine follow-up. In order to attain the best results, supporting research highlights how crucial it is to pay close attention to every step of removable prosthodontic care.

II. Causes and remedies for different iatrogenic failures in fixed prosthodontics

In fixed prosthodontics, iatrogenic failures are problems or difficulties that occur because of mistakes or omissions made during the course of treatment, including as during diagnosis, planning, material selection, tooth preparation, and prosthesis production. The patient's oral health, function, and appearance may suffer as a result of these failures. The common iatrogenic failures in fixed prosthodontics, along with their causes and remedies, are listed below:[7- 13]

1. Inadequate Marginal Fit

Causes:

Inaccurate Tooth Preparation: A poor restoration fit results from improper or insufficient tooth preparation.

Impression Errors: Poor marginal adaptation of the prosthesis may result from distortion or mistakes during the impression-taking procedure. Inaccurate wax-up or incorrect die trimming are examples of laboratory errors that occur during the crown or bridge creation process.

Repercussions: deterioration beneath the crown, bacterial buildup, and microleakage. pain for the patient, periodontal disease, or gum inflammation.

Answers: Ensuring appropriate tooth reduction and equal, smooth margins to support the prosthesis is known as precise tooth preparation. Using premium impression materials (such polyvinyl siloxane) and making sure the tray fits and the impression procedure is done correctly are two ways to get accurate impressions. Working closely with the dental laboratory, using precise models, and confirming fit prior to final cementation are all ways to ensure a proper fit in the laboratory.

2. Failures of Cementation

Causes:

Poor Cement Selection: If the incorrect kind of cement is used, such as non-resin cement for all-ceramic crowns, the bonding strength may be insufficient. The term "inappropriate cementation technique" refers to mistakes made during the cementation process, such as incorrect setting time, contamination of the prepared tooth surface, or poor isolation.

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Inconsistent Cement Application: Using too much or too little cement might cause leaks or a poor bond.
Repercussions:
crown dislodgement or loosening. Marginal leaking causes periodontal problems and deterioration.
Answers:
Cement Selection: Choosing the right cement for the restoration type (e.g., glass ionomer or zinc phosphate for metal-based crowns, or resin cement for all-ceramic crowns).
Correct Cementation Technique: Making sure the prepared tooth is properly isolated, surfaces are clean, and cement is applied carefully. giving resin-based cements enough time to cure.
Control of Contamination: Preventing contamination by keeping tooth surfaces dry and clean.

3. Errors in Tooth Preparation
Causes:
Over-Reduction or Under-Reduction: While excessive reduction might compromise the tooth structure, inadequate reduction can result in a large restoration.
Incorrect Tooth Contour: The fit and functionality of the restoration may be impacted if the axial and occlusal contours are not maintained correctly.
Ignorance of Margin Design: The finish line's positioning can have an impact on the restoration's fit and appearance.
Repercussions:
tooth deterioration that may result in fractures or the need for root canal therapy. Inadequate contouring might lead to practical problems or a poor cosmetic result.
Answers:
Using appropriate reduction guides, making sure there is enough clearance for materials, and adhering to suggested parameters are all necessary for accurate tooth reduction.
Margin Design and Placement: To prevent gum irritation and guarantee the best possible seal, place margins at the right level. A proper occlusal clearance should be provided by the tooth preparation, particularly for crowns having occlusal surfaces.

4. Fracture Restoration
Causes: Choosing materials that are insufficiently robust for the patient's occlusal stresses is known as inappropriate material selection (e.g., choosing porcelain for a posterior restoration without necessary reinforcing).
Inadequate Design: Inadequate reinforcing or poorly designed veneers, crowns, or bridges can cause stress concentration and fractures. Exposing the prosthesis to high occlusal forces, as in individuals with malocclusion or bruxism, is known as occlusal overload.
Repercussions:
chipping or breaking of the repair. aesthetic failure and the requirement for repair or replacement.
Answers: Choosing materials that are appropriate for the prosthesis's location and purpose (for example, posterior crowns made of zirconia or metal-ceramic) is known as appropriate material selection.
Restoration Design: Making sure there is enough occlusal clearance and, if required, utilizing strengthened restorations.
Occlusion control involves evaluating and resolving occlusal disparities, particularly in bruxism patients, by modifying the occlusion or applying splints.

5. After Tooth Preparation, Endodontic Complications
Causes:
Too Much Tooth Preparation: Too much tooth reduction, particularly in the vicinity of the pulp, may expose or harm the pulp.
Inadequate Diagnostic Assessment: If the tooth's vitality is not evaluated prior to restorative therapy, pulpal problems may go undetected.
Repercussions:
extraction of a tooth because to infection or pulp damage, or root canal therapy.
Answers:
Pulp Vitality Testing: Verifying the health of the pulp by conducting the required pulp testing prior to crown preparation.

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Conservative Preparation: To prevent pulp damage, the least amount of tooth structure is removed during preparation.
Close cooperation with endodontists: If pulp health is a concern, patients are referred for endodontic assessment.

6. Complications of Periodontal Disease
Causes: Crown margin placement errors can result in gingival irritation, inflammation, and even periodontal disease if margins are positioned too high or too sub gingivally.
Inadequate Tooth Isolation: If isolation is not maintained during preparation, saliva or blood may contaminate the tooth surface, which could weaken the binding between the prosthetic cement and the tooth.
Repercussions: inflammation, gum recession, or periodontal disease.
Answers:
Appropriate Margin Positioning: To encourage gingival health and prevent overly contoured restorations, margins should be positioned at the ideal level.
Tooth Isolation and Prophylaxis: Making sure the tooth is properly isolated and cleaned prior to cementation.

III. Causes and remedies for a variety of iatrogenic implant prosthodontic failures
In implant prosthodontics, iatrogenic failures are issues or malfunctions brought on by mistakes or omissions made during designing, arranging, or restoring dental implants. These malfunctions may lead to implant failure, harm to the surrounding tissues, or problems for the patient's functionality and appearance. For implant therapies to be successful, it is crucial to comprehend the reasons for these failures, their effects, and possible remedies. The following lists common iatrogenic failures in implant prosthodontics, along with their causes and fixes:[13-17]
1. Failure of Implants Owing to Inaccurate Positioning
Causes:
Improper Implant Positioning: When an implant is positioned incorrectly, it can cause occlusal issues, poor prosthesis fit, and insufficient aesthetics.
Inadequate Planning: Failing to assess bone quality, quantity, and anatomical features prior to surgery using diagnostic methods such as Cone Beam Computed Tomography (CBCT).
Ignorance of Adjacent Teeth: Improper implant placement may result in increased loading pressures on the implant or interfere with alignment with neighboring teeth.
Repercussions:
poor aesthetics, incorrect restorations, and subpar functional results. increased chance of implant failure as a result of inappropriate loading or close contact to critical structures (such as the maxillary sinus or inferior alveolar nerve).
Answers:
Utilizing cutting-edge imaging methods such as CBCT to evaluate bone volume, density, and anatomical features is known as pre-operative imaging planning. Using surgical guidelines or computer-assisted planning to guarantee accurate implant placement is known as guided implant surgery. Taking Adjacent Teeth and Soft Tissues into Account: Arranging the implant location to complement the occlusion, soft tissue shapes, and neighboring teeth.

2. Overloading the Implant and Later Failure
Causes:
Inappropriate Occlusal Loading: Implants that experience high or irregular occlusal forces—such as bruxism or incorrect implant placement—may fail.
Premature Loading: Failure may result if the restoration is placed on the implant before the osseointegration process is finished.
Poor Prosthesis Design: Improper crown-to-implant ratios or too large restorations might cause the prosthesis to be poorly designed, which can lead to less than ideal implant loading.
Repercussions:
implant failure, such as implant fracture, prosthesis loosening, or bone loss surrounding the implant.
inflammatory responses in the tissues around them.
Answers:
Appropriate Occlusion: Making sure the occlusion is balanced and adjusted to avoid putting undue strain on the implant.
Delayed Loading: Placing the prosthesis after giving the osseointegration enough time, usually three to six months.

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Customized Prosthetic Design: Creating a prosthesis that distributes occlusal forces uniformly and prevents the implant from being overloaded.

3. Both peri-implantitis and infection

Causes:

Poor Oral Hygiene: Bacterial collection from improper washing of the prosthesis or implant site can cause peri-implantitis or peri-implant mucositis.

Surgical Contamination: Infection may result from improper aseptic method used during prosthesis attachment or implant implantation surgery.

Excessive Surgical Trauma: Inadequate flap control or overheating of the bone during drilling might impair osseointegration and increase the risk of infection.

Repercussions:

Peri-implantitis, or inflammation and infection surrounding the implant, can result in bone loss, implant failure, or the need for further surgery. discomfort, pain, and the potential need to remove the implant.

Answers:

Aseptic Technique: Preventing infection by following appropriate sterile procedures during surgery and prosthesis placement. Teaching patients how to maintain good oral hygiene around implants, such as using soft toothbrushes, interproximal brushes, and antimicrobial rinses, is known as oral hygiene education.

Antibiotic Prophylaxis: Giving the right antibiotics both before and after surgery, if required.

Frequent Monitoring: Regular evaluations and follow-ups to look for early indicators of peri-implantitis and, if necessary, to take appropriate action.

4. Bone Loss as a Result of Overheating or Improper Implant Positioning

Causes:

Poor Bone Preparation: Too much drilling or an improperly sized implant may leave too little bone for osseointegration, which can cause bone loss.

Overheating of Bone: Excessive friction or insufficient cooling during implant placement can cause overheating, which can harm bone cells and hinder osseointegration and healing.

Repercussions:

loss of bone surrounding the implant, which lowers stability and the implant's long-term viability. Implant removal or bone grafting may be required.

Answers:

Accurate Bone Preparation: To prevent overheating and guarantee adequate bone preparation, use drills with regulated speed and cooling. Choosing the right implant size for the available bone while avoiding over-preparation is known as appropriate implant sizing.

Post-operative Monitoring: Using radiographs and clinical assessment to track bone health after surgery.

5. Abutment screws that are overtightened or under tightened

Causes:

Inappropriate Torque Application: If the abutment screws are overtightened or under tightened, the screws may loosen, the implant may fracture, or the prosthesis may sustain damage. Use of Inadequate Instruments: Improper tightening may occur if calibrated torque wrenches or appropriate instruments are not used.

Repercussions:

fracture or loosening of the prosthesis or implant, necessitating replacement or repair.

Answers:

Appropriate Torque Control: Tighten abutment screws to the torque level advised by the manufacturer using a calibrated torque wrench.

Proper Tools: To avoid overtightening or under tightening the screw, use the proper tools for tightening and inspecting it.

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6. Failures in Aesthetics

Causes:

Poor Esthetic Planning: Poor esthetics can be caused by improper implant position planning or a poor choice of prosthetic parts.

Insufficient Soft Tissue Management: Gingival recession, an unsightly appearance, or an abnormal gum line can result from inadequate soft tissue management surrounding the implant site.

Repercussions:

unsatisfactory appearance that undermines the patient's self-esteem and contentment. Reimplantation or modification of the prosthetic is required.

Answers:

Appropriate Aesthetic Planning: Careful planning that takes into account the final prosthetic result, including soft tissue management, bone structure, and implant position.

Soft Tissue Grafting: To guarantee a normal gingival shape surrounding the implant, soft tissue grafts may be required.

In implant prosthodontics, iatrogenic failures can be caused by a number of things, including inadequate planning, incorrect implantation, inappropriate occlusal loading, infection, and aesthetic issues. Careful pre-operative planning, the application of cutting-edge diagnostic technologies, appropriate implant placement methods, and maintaining good oral hygiene after surgery are all necessary to prevent these failures.

IV. Causes and remedies for different iatrogenic failures in maxillofacial prosthodontics

In maxillofacial prosthodontics, iatrogenic failures are problems that occur as a result of mistakes or omissions made during the diagnosis, planning, design, manufacture, or upkeep of prostheses. Patients who need prosthetic rehabilitation because of congenital malformations, accident, or illness may experience functional, cosmetic, and psychological problems as a result of these failures. The several iatrogenic failures in maxillofacial prosthodontics are listed here, along with their causes, possible fixes, and corroborating sources. [18-21]

1. Poor Prosthesis Fit and Retention

Causes:

Inaccurate Impressions: Inaccurate molds and, as a result, a poorly fitting prosthesis might result from distortion of the impression materials during the taking procedure.

Improper Prosthetic Design: The prosthesis's shape, contour, or lack of adequate retention mechanisms (such clasps or adhesive retention) are examples of improper prosthetic design.

Changes in Facial Tissues: Over time, edema, scarring, or atrophy in soft tissues following surgery or trauma may cause the prosthesis to fit differently.

Repercussions:

loose or unstable prostheses can cause discomfort, make it harder to do some tasks (like eating or speaking), and raise cosmetic issues.

potential for further tissue damage or discomfort as a result of improperly fitting prosthesis.

Answers:

Using cutting-edge imprint materials (such silicone elastomers) and making sure the tray fits and is done correctly are examples of accurate impression techniques. To capture the fine characteristics of the tissues, a two-step or functional impression procedure could be needed.

Optimizing the design of a prosthesis by incorporating retention mechanisms such adhesive systems, implants, or magnets. Soft tissue anatomical alterations are taken into account during the design stage.

Frequent Adjustments: Keeping an eye on tissue alterations following therapy and modifying the prosthesis as needed.

2. Esthetic Failure (Unsatisfactory Visual Appeal)

Causes:

Inaccurate Color Matching: When prosthetic materials or pigments are chosen incorrectly, they may not blend in with the patient's skin tone or nearby natural tissue.

Inadequate Wax-Up or Mold Design: A prosthesis that does not resemble the patient's natural appearance may be the consequence of mistakes in the prosthetic design or improper facial modeling (e.g., an erroneous nose, ear, or eye prosthesis design).

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Absence of Appropriate Tissue Contour: Unnatural or large prosthesis might result from improper consideration of the surrounding soft tissues, such as eyelids, lip contours, or skin folds.
Repercussions:
psychological discomfort brought on by discontent with the way the prosthetic looks.
increased prosthesis visibility or the development of an artificial facial contour, which can negatively impact the patient's quality of life and sense of self.
Answers:
Digital Design and 3D Printing: To produce precise and visually appealing prostheses, 3D printing and sophisticated computer-aided design (CAD) software are used.
Color Matching and Customization: To achieve a near resemblance to the patient's natural skin tone, advanced pigmentation procedures or specially tinted silicone can be used for aesthetic color matching.
Multidisciplinary Approach: Working together with dermatologists and the surgical team to make sure the prosthesis is made to blend in with the patient's natural anatomy and tissue.

3. Failure of the Material (Tear, Wear, or Fracture)
Causes:
Inappropriate Material Selection: Using materials that aren't adequate for the prosthesis's functional requirements, like ones that can't handle the strain of speaking, chewing, or other activities.
Improper Curing: Poor mechanical qualities and early failure can result from improper curing or polymerization of the material, particularly for silicones or acrylic resins.
Exposure to Adverse Conditions: Over time, materials like silicones or acrylics may deteriorate due to environmental variables including high temperatures, dampness, or UV radiation.
Repercussions:
The prosthesis may need to be replaced or repaired frequently if it breaks, rips, or becomes brittle.
Sharp edges or components that are not well held could cause damage to the surrounding tissues.
Answers:
Material Selection: For endurance and durability, use high-performance materials such as flexible resins, polyurethane, or medical-grade silicone.
Inadequate Curing: Making sure that the right curing procedures are followed, especially for materials that need to be heated or light-cured in order to acquire the appropriate mechanical qualities.
Use of Coatings or Protective Layers: When the prosthesis is exposed to light or other environmental factors, material deterioration can be avoided by applying protective coatings or UV inhibitors.

4. Damage or Irritation of Soft Tissue
Causes:
Excessive Pressure on Tissues: The underlying soft tissues (such as the skin and mucosa) may become mechanically irritated by poorly fitting prostheses or by the overextension of the prosthetic borders.
Inadequate Border Definition: Tissue irritation or scarring may result from a prosthesis that deviates from the soft tissues' natural form.
Improper Prosthesis Contouring: The surrounding tissues may be irritated and injured by the prosthesis's sharp edges or rough surfaces.
Repercussions:
scar tissue development, ulcerations, or persistent inflammation.
pain or discomfort that makes it difficult for the patient to wear the prosthesis.
Answers:
Making ensuring the prosthesis fits correctly and doesn't put undue strain on the soft tissues is known as the "optimal prosthetic fit." It might be required to do routine reline processes and modifications.
Making sure the prosthesis is smooth and free of sharp edges or uneven surfaces is known as polishing.
Flexible Materials: To avoid irritation, use soft or flexible liners when coming into direct contact with delicate tissues.

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5. Poor Retention or Dislodgement of the Prosthesis

Causes:

Inadequate Retention Mechanism: Inadequate retention mechanisms, such as sticky agents, magnets, or mechanical undercuts.

Insufficient Anatomical Support: Retention may be hampered by the loss of soft tissue or bone surrounding the prosthesis.

Changes in Tissue Structure: Edema or scarring in the face following surgery may affect how well the prosthesis fits and stays in place.

Repercussions:

The patient's confidence and capacity to carry out everyday tasks may be impacted if the prosthesis becomes loose or falls off.

more frequent maintenance visits or the requirement for a refurbishment.

Answers:

Enhanced Retention Systems: securing the prosthesis with retention aids like implants, magnets, or well crafted clasps.

Customized Prosthetic Fit: Frequently modifying the prosthesis to accommodate modifications in the soft tissue support and face anatomy of the patient.

Implant Retained Prostheses: Using osseointegrated implants to give extra retention in situations when there has been a severe loss of soft tissue or bone.

6. Functional Failure (Had Trouble Chewing, Swallowing, or Speaking)

Causes:

Inadequate Prosthetic Design: A badly constructed artificial nose or ear, for example, might have an impact on the patient's comfort and facial function.

Absence of Proper Occlusion: Speech, swallowing, and chewing may be affected if the prosthesis obstructs normal oral function or produces an abnormal occlusion.

Repercussions:

inability to carry out everyday tasks like eating, smiling, or speaking, which causes discomfort or social shame.

diminished quality of life as a result of compromised oral or face function.

Answers:

Function-Focused Design: Giving the prosthesis's ability to move the face, chew, and talk top priority.

Prosthetic adjustments are necessary on a regular basis to make sure the device doesn't obstruct vision or create pain when performing functional tasks.

Inaccurate impressions, poor material selection, subpar prosthetic design, or inadequate retention mechanisms are some of the causes of iatrogenic failures in maxillofacial prosthodontics. The patient may have physical discomfort, functional limitations, or aesthetic issues as a result of these failures. To solve these problems, meticulous preparation, accurate methods, and constant adaptation are needed. Many of these issues have been resolved by developments in digital design, material science, and retention systems, which have improved patients' functional and cosmetic results.

II. CONCLUSION

Despite being frequently avoidable, iatrogenic prosthodontic failures continue to pose a serious problem in dental treatment. Inaccurate diagnoses, poor treatment planning, fabrication errors, and insufficient follow-up care are some of the causes of these failures. The fundamental causes of failure in various prosthodontic specialties, including fixed, removable, implant, and maxillofacial prosthodontics, frequently include problems with material selection, inadequate fit, retention challenges, and unsatisfactory functional or cosmetic results. Reduced patient quality of life can result from these failures, which can cause anything from modest discomfort and discontent to serious functional impairment and degraded aesthetics.

However, with careful and thorough treatment planning, accurate clinical execution, and continuous patient monitoring, these problems can be resolved. The risk of iatrogenic consequences can be considerably decreased by using digital prosthetic design, enhanced impression procedures, sophisticated diagnostic equipment, and premium, long-lasting

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materials. Proactive patient management can also lessen long-term problems. This includes prompt adjustments and routine follow-up visits.

REFERENCES

1. Rudd & Rudd, A review of 243 errors possible during the fabrication of a removable partial denture: Part III. J Prosthet dent; 2001;86(3); 251-261.
2. Pelekos G, Karkazis HC, Papavasiliou G, Zinelis S. Clinical outcomes of implant-supported fixed dental prostheses with different veneering materials: a systematic review and meta-analysis. Clin Oral Implants Res 2021 Feb;32(2):222-236.
3. Pelekos G, Karkazis HC, Papavasiliou G, Zinelis S. Clinical outcomes of implant-supported fixed dental prostheses with different veneering materials: a systematic review and meta-analysis. Clin Oral Implants Res 2021 Feb;32(2):222-236.
4. Andreiotelli M, Att W, Strub JR. Prosthodontic complications with implant overdentures: a systematic literature review. Int J Prosthodont. 2010;23(3):195-203.
5. Bedrossian, E., Rashedi, B., & Yang, J. Quality of communication and doctor-patient relationship in prosthodontic treatment: A systematic review. Journal of Prosthodontics, (2019) 28(3), 276-283.
6. Bergendal, B., Bergendal, T., & Lindh, C.. Patient-reported outcome measures for evaluation of removable dental prostheses: A systematic review. Journal of Prosthetic Dentistry, (2018)119(3), 335-342.
7. Al-Mardini, M., & Dar-Odeh, N.. Failure rate of fixed partial dentures made by prosthodontic residents at the University of Jordan. Journal of Prosthodontics, (2013)22(4), 305-310.
8. De backer H, Van Maelae G, et al. A 20 year Retrospective survival study of fixed partial dentures. Int J Prosthodont 2006; 19:143-153.
9. Jung RE, Sailer I, Hammerle CH, Attin T, Schmidlin P. In vitro color changes of soft tissues caused by restorative materials. Int J Periodontics Restorative Dent. 2007;27(3):251-257.
10. Meirelles, L. D., Neves, F. D., Silva, P. V., & Giannini, M. The effect of sandblasting and metal primers on the bond strength of resin cement to Co- Cr alloys. The Journal of Prosthetic Dentistry 2015;. 113(6), 616-622.
11. Sadid-Zadeh, R., & Babaloo, A. Analysis of the factors associated with the failure of fixed partial dentures. Journal of Prosthodontic Research 2010;54(2): 78-82.
12. Shyamala, R., & Aggarwal, H. An insight into failures in fixed partial dentures: A clinician's perspective. Indian Journal of Dental Research 2015; 26(3): 274-280.
13. Turrell, J. The effect of design and fit on the success and failure of implant- supported prostheses: A literature review. Journal of Prosthetic Dentistry, (2012).108(4), 207-213.
14. Shin YG, Kim SY, Lee HK, Jeong CM, Lee SH, Huh JB. Effect of double screw on abutment screw loosening in single-implant prostheses. Int J Prosthodont. 2016;29(5):445-447.
15. Salvi GE, Bragger U. Mechanical and technical risks in implant therapy. Int J Oral Maxillofac Implants. 2009;24(Suppl):69-85.
16. Cehreli MC, Karasoy D, Kokat AM, Akca K, Eckert SE. Systematic review of prosthetic maintenance requirements for implant-supported overdentures. Int J Oral Maxillofac Implants. 2010;25(1):163-180.
17. Chen KW, Lin TM, Liu PR, et al. An analysis of the implantsupported overdenture in the edentulous mandible. J Oral Rehabil. 2013;40(1):43-50.
18. Satya Sai Sruthi Yalamolu, Lakshmana Rao Bathala, Satyanarayana Tammineedi, Sri Harika Lakshmi Parvathi Pragallapati, Chakradhar Vadlamudi. Prosthetic Journey of Magnets: a review. Journal Med Life 2023;16(4):501-506.
19. Kondaka S, Singh VD, Vadlamudi C, Bathala LR. Prosthetic rehabilitation of untailored defects using patient specific implants. Dent Res J 2022; 19:1-5.
20. Santhi B, Rao BL, Satyanarayana TSV, Padmini D, Bhargavi B, Saikumar CD. Retention in Maxillofacial Prosthetics: A Literature Review. Global Journal for Research Analysis (GJRA) 2022;11(2):1-3.
21. Krishnateja GVRSR, Rao BL, Singh NK, Santhi B, Aditya K, Saikumar CD. Art opens the Finest Eye- A Case Report. J Bio Innov 2022; 11(1):175-181.

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