# Dental Restorative Market Analysis and Forecast Through Geographical and Product Segmentation (2017-2021)


***By***

*Apurva Verma*


*Dissertation submitted for the partial fulfillment of the*

*MBA Hospital and Health Management*

***Academic year, 2015-2017***


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INSTITUTE OF HEALTH
MANAGEMENT RESEARCH
(WHO Collaborating Centre for District Health System Based on Primary Health Care)

IIHMR UNIVERSITY

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This is to certify that **Dr. Apurva Varma student** of **MBA Hospital and Health Management** from The IIHMR University, Jaipur has undergone internship training at **Infiniti Research, Bangalore** from **January 30th, 2017 to May 1st, 2017**.

The Candidate has successfully carried out the study designated to him during internship training and his approach to the study has been sincere, scientific and analytical.

The Internship is in fulfillment of the course requirements.

I wish him all success in all his future endeavors.

(Col.) Dr. Ashok Kaushik

Dean - Academics and Student Affairs
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infiniti RESEARCH

The certificate is awarded to

**Dr. Apurva Varma**

In recognition of having successfully completed his
3 months of dissertation in the department of

**Healthcare**

and has successfully completed his Project on

**Dental Restorative Market Analysis and Forecast Through Geographical and Product Segmentation (2017-2021)**

**Date: 30th Jan 2017 - 1st May 2017**

**Organization: Infiniti Research Marketing Solutions India Pvt.Ltd**

He comes across as a committed, sincere & diligent person who has a strong drive and zeal for learning

We wish him all the best for future endeavors

For Infiniti Research Marketing Solutions India Private Limited

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Mohammad Faisal Ghaus
Director

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**THE IIHMR UNIVERSITY, JAIPUR**

## CERTIFICATE BY SCHOLAR

This is to certify that the dissertation titled **"Dental restorative market analysis and forecast through geographical and product segmentation (2017-2021)"** and submitted by Apurva Varma, Enrolment No 260 under the supervision of Brig. (Dr.) S. K. Puri for award of MBA in Hospital and Health Management of the University carried out during the period from 30th Jan 2017 to 1st May 2017 embodies my original work and has not formed the basis for the award of any degree, diploma associate ship, fellowship, titles in this or any other institute or other similar institution of higher learning.

Apurva Varma
18/05/17

**Signature**

**THE IIHMR UNIVERSITY, JAIPUR**

**CERTIFICATE BY SCHOLAR**

This is to certify that all ethical issues have been considered while collecting data for my dissertation titled **"DENTAL RESTORATIVE MARKET ANALYSIS AND FORECAST THROUGH GEOGRAPHICAL AND PRODUCT SEGMENTATION 2017-2021"**

Apurva Varma
18/05/17

Signature of student

# PREFACE

In recent years the Indian Economy has been undergoing an important transition a shift from ownership to professional management. This project has been performed as a part of my dissertation in the second year of MBA.

This will also serve as basic knowledge in respect of **“Dental restorative market analysis and forecast through geographical and product segmentation (2017-2021)”**as well as in department procedures and systems followed in the organization.

This project report covers various activities which involve in efficient use of dental restorative products. It is accompanied with number of formats, charts and flow diagrams which will be helpful in understanding the subject matter.

I have put my endeavour to make the objective accomplished in the stipulated time. Despite all the limitations, obstacles, hurdles and hindrances I have toiled my hand to achieve the goal desired. Being a neophyte in the highly competitive world of business and in cooperate world, I have come across difficulties to make the objective a reality. Anyhow with the kind help and genuine interest formally supported by extreme support of my guide and college authorities, I am presenting this hand carved efforts.

# DECLARATION

I, **Apurva Varma,** certify that the Project Report entitled **"Dental restorative market analysis and forecast through geographical and product segmentation (2017-2021)"** is an original one and has not been submitted to any other Institution for the fulfillment of the requirement of a course of Management Programme (MBA).

**Place: Bangalore** **Dr.Apurva Varma**

**Date:18/05/2017** **Mobile No. : 9036126100**

# ABSTRACT


## BACKGROUND:

Dentistry is a branch of medicine that is involved in the study, diagnosis, prevention, and treatment of diseases, disorders and conditions of the oral cavity, commonly in the dentition but also the oral mucosa, and of adjacent and related structures and tissues, particularly in the maxillofacial (jaw and facial) area. Although primarily associated with teeth, the field of dentistry or dental medicine is not limited to teeth but includes other aspects of the craniofacial complex including the temperomandibular and other supporting structures.

Restorative Dentistry can be defined as ‘including clinical practice, teaching and research into comprehensive and therapeutic oral health care for patients of all age groups including those who demonstrate medical, physical, intellectual, psychological and/or emotional problems. It involves the restoration and rehabilitation of the oral and dental tissues lost as a result of disease, inheritance and trauma to meet the aesthetic, psychological and functional needs of the patient, often requiring the co-ordination of multi-professional teams within dentistry. Restorative dentistry involves the care of patients who require restoration of the oral and dental tissues.

Various materials are used in restorative dentistry which includes amalgam, dental cements, composites, ceramics and liners. These materials can be used across different branches of dentistry like prosthodontics, periodontics and endodontics.

Dental restorative material market is anticipated to grow at a significant rate during the forecast period because of the increasing carious condition and accidental cases. Companies such as 3M ESPE AG, GC Corporation, Ivoclar Vivadent and Dentsply Sirona are striving the market growth through development of innovative and user friendly products.

## OBJECTIVE:

To assess global dental restoration market and forecast through various segments for year 2017-2021

## RESEARCH METHODOLOGY

- **Study Design:** Descriptive and Exploratory study
- **Study Area:** Bangalore
- **Duration of study:** $30^{th}$ January 2017 – $1^{st}$ May 2017
- **Data collection procedure:**
    - **Primary research:** Data is collected through primary researchwith structure questionnaire. The research questions has been asked from industry experts, manufacturers and strategic decision makers.
    - **Secondary research:** Majorly, the data is collected through secondary research after reading articles, journals, literatures and internet.
- **Data analysis tools:** MS excel and SPSS

## CONCLUSION

Dental restorative material market is anticipated to grow at a significant rate during the forecast period because of the increasing carious condition and accidental cases.

The US was the highest revenue contributor to the market owing to the increase in dental caries incidences and road accident cases. Growing aging population being the most favoured driver in EMEA which is followed by the Americas in terms of revenue contributor. APAC has the least revenue contribution among these three but it has the fastest growing market owing to the emerging market conditions and high population.

In product segmentation, dental amalgam is the major revenue contributor followed by dental composite and dental cements. Dental liner is the least shareholder in this segment.

Dental composite is the fastest growing product in the market with highest CAGR owing to its aesthetic and durable properties.

# ACKNOWLEDGEMENT

I hereby wish to take the opportunity to express my gratitude to**Brig. (Dr.) S. K. Puri, VSM (Retd) MBBS, MD, NDC, Advisor (Academic and Student Affairs), The IIHMR University, Jaipur** for allowing to undertake my dissertation project on **"Dental restorative market analysis and forecast through geographical and product segmentation (2017-2021)".**

I want to acknowledge the help provided by guide and friends. The precious inputs provided by them have helped in compiling this report. As well as I want to thank my friends and colleagues who helped me in this working.

I express my deep-hearted thanks and gratitude to all of those who helped me in this Project.

# Dental Restorative Market Analysis and Forecast Through Geographical and Product Segmentation (2017-2021)

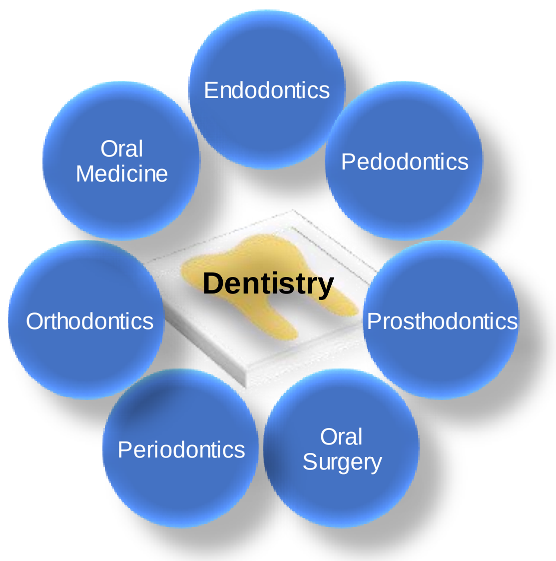

Submitted by:
Dr. Apurva Varma
MBA HM20
Roll No- 0260

# Contents

## INTRODUCTION

Dentistry is a branch of medicine that is involved in the study, diagnosis, prevention, and treatment of diseases, disorders and conditions of the oral cavity, commonly in the dentition but also the oral mucosa, and of adjacent and related structures and tissues, particularly in the maxillofacial (jaw and facial) area. Although primarily associated with teeth, the field of dentistry or dental medicine is not limited to teeth but includes other aspects of the craniofacial complex including the temperomandibular and other supporting structures.

Dentistry is divided into 7 major branches:




Keeping teeth healthy is important for many functions, such as eating and speech, whilst for the majority of people in our society good aesthetics are a major concern and kept with high priority. Outcome of dental procedures should be a healthy comfortable mouth with sound intact teeth. Dental care must be designed in such a way so as to maintain healthy oral condition and to prevent any future problems.

Restorative Dentistry can be defined as ‘including clinical practice, teaching and research into comprehensive and therapeutic oral health care for patients of all age groups including those who demonstrate medical, physical, intellectual, psychological and/or emotional problems. It involves the restoration and rehabilitation of the oral and dental tissues lost as a result of disease, inheritance and trauma to meet the aesthetic, psychological and functional needs of the patient, often requiring the co-ordination of multi-professional teams within and outwith dentistry

Restorative dentistry involves the care of patients who require restoration of the oral and dental tissues.Restoration of the oral tissues requires technical skills, the clinician is intimately involved in the decision-making process. A patient should receive investigations that lead to a correct diagnosis. After taking careful history and examination of the patient a clinician reaches to their diagnosis. Only then a treatment plan can be drawn up which helps in achieving oral stability. The clinician should be an expert in all the disciplines that make up restorative dentistry and should also be able to integrate them in a sensible order.

Various materials are used in restorative dentistry which includes amalgam, dental cements, composites, ceramics and liners. These materials can be used across different branches of dentistry like prosthodontics, periodontics and endodontics.

Dental restorative material market is anticipated to grow at a significant rate during the forecast period because of the increasing carious condition and accidental cases. Companies such as 3M ESPE AG, GC Corporation, Ivoclar Vivadent and Dentsply Sirona are striving the market growth through development of innovative and user friendly products. These companies are dedicated towards building partnerships or even indulging in mergers and acquisitions and are participating in various scientific conferences to showcase their products. This will continue to drive long-term development opportunities for manufacturers in this market.

The market is growing at a significant pace which allows vendors to enter this market and avail good opportunities.

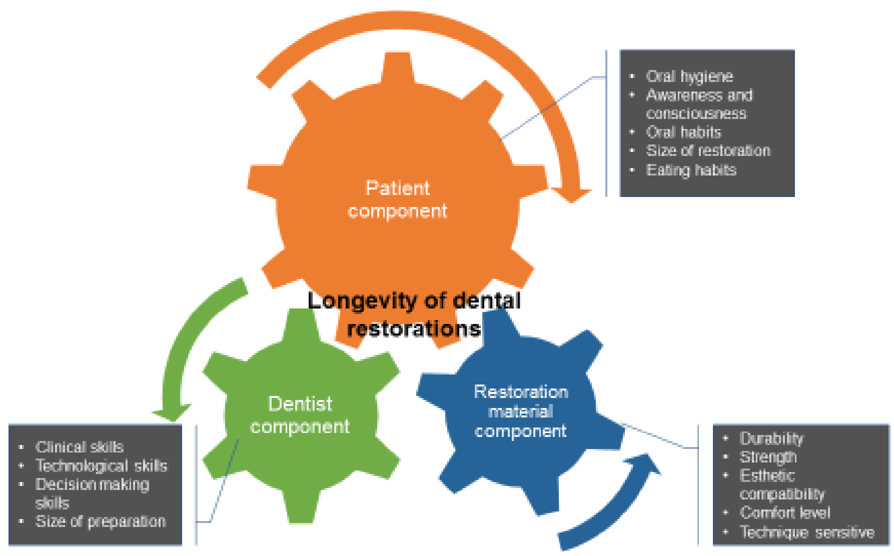
Increased prevalence of dental caries and increased accidental cases has led to increase the market of dental restorative material market.

These products are in high demand in hospitals and independent dental clinics as these facilities are in abundance worldwide and restorative procedures are done more frequently.

Although there are some challenges which tends to limit the growth of dental restorative material market like cost involved in the dental cosmetic procedures. Cost incurred in these procedures are high because of which some families have to skip the treatment. Adding to it dental insurance does not cover the cosmetic dental procedures for most of the part.

Utilization of dental care has also been changing continuously which is a challenge for this market to dwell.

Despite these challenges some trends are allowing this market to grow with a considerable pace like increasing demand for advanced cosmetic procedures and continuous development in technology which allows the concept of mass digitalization in dentistry. However, awareness among people has also been increased to avail dental treatment and to maintain a healthy oral condition which would lead to the growth of the dental restorative material market.




## OBJECTIVE

To assess global dental restoration market and forecast through various segments for year 2017-2021

## LITERATURE OF REVIEW

The concept of coronal leakage causing endodontic failure is not a new one. In 1961, Marshall and Massler speculated on the role of the occlusal seal on the outcome of endodontic treatment. They undertook a study with a radioactive tracer and showed the presence of coronal leakage in spite of the presence of a temporary restoration. Further studies by other researchers led to similar inferences.

In 1990, two landmark studies served as an eye-opener for clinicians and academicians. Torabinejad et al. studied the penetration of different microorganisms on single-rooted obturated teeth but without coronal restoration. In 19 days, 50% of the canals were contaminated to their full length after being exposed to Staphylococcus epidermidis. Proteus vulgaris took 52 days for the same outcome.

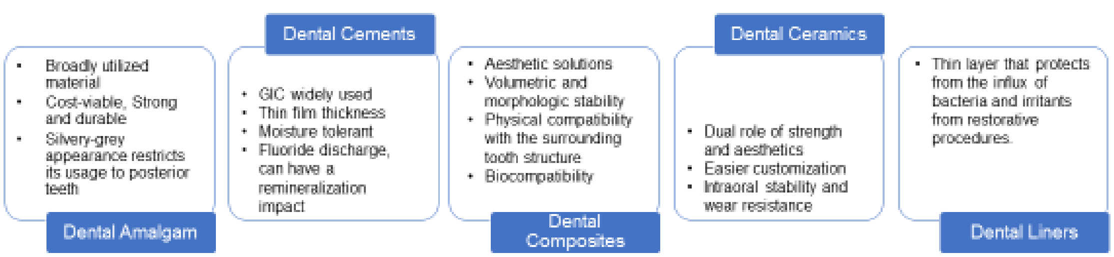
In the same year, Saunders and Saunders studied coronal leakage in root-filled molars. They showed that the common practice of packing excess gutta-percha in the floor of the pulp chamber provided an inadequate seal. They recommended the removal of this excess gutta-percha, leaving only that on the root canal orifices, and sealing the floor with a restorative material like amalgam or glass polyalkanoate.

In 1995, Ray and Trope published a retrospective clinical study based on the radiographic assessment of patients with high incidence of apical pathology. More than 1000 patients participated in this study. For the first time, the absence of apical pathology (success percentage) was compared to the quality of coronal seal. They concluded that "the quality of the coronal restoration is significantly more important than the quality of the endodontic treatment for periapical health." This conclusion ruffled quite a few feathers. Till then, the postendodontic restoration was considered as a requirement only for restoring the tooth to function. The fact that it could affect the outcome of endodontic treatment; moreover, it could be more important than the obturation, was a startling revelation. This assessment also sort of undermined the importance of a good obturation.

Wright et al. in his study reported that 28 (71.8%) of the females showed fear of dental needles. This study results were statistically significant that showed the highest mean score was 3.13

when strongly agreed that nothing is as painful as a needle in the mouth followed by the mean score of 2.86 when strongly agreed that seeing the needle is terrifying and a mean score of 2.72 when strongly agreed that idea of needle penetrating the body is fearful. Milgrom et al. in his study reported that highest mean score of 4.1 was observed when seeing the needle is terrifying which is followed by a mean score of 4.0 for nothing is as painful as a needle in the mouth and a mean score of 3.5 for the idea that needle penetrating the body is terrifying. Eighteen (11.9%) of the females and 10 (10.1%) of the males strongly agreed to that nothing is as painful as needle in your mouth. Nineteen (12.6%) of the females and 11 (11.1%) of the males strongly agreed that is the idea of needle penetrating the body is fearful.

## THEORY




### Amalgam

Dental amalgam is a liquid mercury and metal alloy blend used to fill pits created by dental caries. Dental amalgam is a blend of a silver alloy with mercury. The silver combination is a fine powder that is made for the most part out of silver, tin and copper, and infrequently zinc, palladium or indium. At the point when the silver combination and mercury are blended, a chemical reaction occurs that structures dental amalgam. This response amongst combination and mercury is named as amalgamation response or trituration.

Amid the procedure of trituration, the surface layer of the silver-tin amalgam breaks up in the fluid mercury, and there is a response that prompts the development of new stages. These new stages are strong, and their development causes the plastic amalgam paste to solidify. Various metallurgical stages are included in this change.

Dental amalgam is the most broadly utilized material. It has been being used for more than 150 years. However, a few types of mercury are found to be hazardous, the mercury in amalgam is chemically bound to the metals present, to make it stable and accordingly safer for use in dental applications. Dental amalgam is utilized as a part of all surfaces of posterior teeth and at times in the lingual pits of anterior teeth. Amalgams are a major part of the dental restorative treatments. But because of its silvery-grey appearance, rebuilding efforts are constrained to posterior teeth. The popularity of dental amalgam comes about because of its cost-viability, toughness and the usability.

Moreover, studies have demonstrated that the rate of failure among amalgam restoration is less than that with some other restorative material. In any case, the failures that do happen are frequently because of faulty plan of the cavity preparation and inappropriate control of the material.

## Dental cements

Dental cements are hard, brittle materials produced by mixing powder and liquid together. They are either resin cements or acid-base cements. In acid base cements the powder is a basic metal oxide or silicate and the liquid is acidic. An acid base reaction occurs followed by the formation of a metal salt which acts as the cementing matrix.

Among dental cements most commonly and widely used cement is GIC (glass ionomer cement). GIC has been a brilliant performer for a long time, and this classification of dental cements is utilized essentially in the cementation of metallic and PFM restoration efforts. GI cement has a thin film thickness, is greatly moisture tolerant, and because of fluoride discharge, can have a remineralization impact with demineralized tooth structure.

### Dental composites

Dental composites are aesthetically very superior along with the durability capabilities. With these qualities of this material, it is relatively inexpensive.

### Dental ceramics

Dental ceramics are also aesthetically very superior but it has an added characteristics that it has very high durability characteristics. It is used in crown and bridges because of these characteristics.

### Dental liners

Dental liners are used to restrict bacteria and bacterial toxins into the tooth structure from the margins or from the restorations.

## METHODOLOGY

It was a descriptive exploratory study taking into account a detailed picture of the market by way of study, synthesis, and summation of data from multiple sources. Various facets of the market with a particular focus on identifying the key industry influencers have been identified. The data thus presented is comprehensive, reliable, and the result of extensive research, both primary and secondary.

### Information sources

#### Primary research

- Manufacturers/Suppliers
- Channel partners
- Industry experts

- Strategic decision makers

**Secondary research**

- Company's internal repository
- Industry journals and periodicals
- Government bodies
- Annual reports of key stakeholders

## Data analysis

**Data synthesis**

- Collation of data
- Estimation of key figures
- Analysis of derived insights

**Data validation**

- Triangulation with data models
- Reference against proprietary databases
- Corroboration with industry experts

## Report writing

**Qualitative analysis**

- Market drivers
- Market challenges
- Market trends

**Quantitative analysis**

- Market size and forecast
- Market segmentation
- Geographical insights
- Competitive landscape

Company’s database and industry-specific repositories have been used for defining the hypothesis for the study, which is further fine-tuned through primary research involving industry experts. Research approach lies in the fact that viewpoint of all stakeholders was taken into consideration while analyzing an industry and objectively assess each outlook.

**Secondary sources**

- Company financials
- Analyst presentations
- Equity research reports
- Historical data
- Technical journals
- Press releases

**Insights**

- Identifying the major parameters impacting the market
- Analyzing the performance of key companies in the market
- Understanding the dynamics of the key segments within the market
- Outlining the performance of the market across regions

**Primary sources**

- Perspective of industry participants through questionnaires
- Discussion with key companies operating in the value chain
- Insights from company’s database of contacts
- Consultation with industry experts

**Insights**

- Identifying the key factors that drive and act as market constraints
- Determining how the market will evolve during the forecast period
- Comprehending the critical trends that will affect the market in future
- Analyzing the strategies of key companies in the market

## MARKET DRIVERS

**Increasing prevalence in dental caries**

Dental caries has emerged to be a major health problem and is considered the most important component of global burden of oral diseases. Dental caries is the destruction of dental hard tissues resulting in decalcification of inorganic constituents and dissolution of organic components. It is caused mainly by the acid produced by microorganisms from the fermentation of dietary carbohydrates. Despite taking all preventive measures and health promotion efforts, dental restorations are still needed.

Dental caries is a major health issue in most of the high-income countries as this disease affects 60-90% of school aged children and near about every adult in the population. DMFT (Decayed, Missing and Filled Teeth Index) is used to measure the severity of dental caries for the permanent dentition. It has been estimated that on an average, the global DMFT index of children aged 12 years is 1.6, however it varies according to different geographic countries and regions.

The incidence in this age group was found out to be highest in the Americas and European countries and it was somewhat on a lower side in Eastern Mediterranean and Western Pacific regions. South East Asia and the African countries are considered less severe regions for the prevalence of the dental caries.

The prevalence of dental caries was less in low and middle income countries until recent years when the cases tended to increase rapidly with changing lifestyle along with changing behavioural habits, increase in consumption of sugars, reduced intake of fluorides and lack of national programmes to restrict the oral diseases.

Prevalence of dental caries is high among adults as nearly 100% of the adult population is affected by the condition in the majority of countries. In the age group of 34-44 years of most of the high-income countries and some countries of Latin America, high DMFT values have been observed i.e. 14 teeth affected by caries while it is relatively low in the low-income countries of Africa and Asia. However, recent reports have indicated a growing burden of dental caries among adults in low and middle income countries.

**Increasing road accident cases**

Road transportation is a major medium which provides a wide range of benefits to both the nation and to individuals by facilitating the movement of goods and people. It provides increased access to education, jobs, healthcare and economic markets which have direct or indirect impacts on the health of the population.

However, road transportation has also increased the burden of risk over the people's health-mainly in the form of road traffic injuries. Cases of road traffic injuries often have to opt for dental treatment which also includes the dental restoration procedures. In road traffic injuries the victim may suffer a blow to the jaw region which may result in destruction of anatomy of the dental structures.

About 1.25 million people dies every year as a consequences of road accidents. 20-50 million people suffer non-fatal injuries which results in the disability or morbidity as a result of their injury. Road traffic injuries are the major cause of deaths among young people aged 15-29 years.

Road traffic injuries causes a considerable loss, it includes economic loss to the victims, their families and to nation as a whole. They have to pay for the cost of treatment which includes incident investigation and rehabilitation. A research carried out in 2010 suggested that road traffic crashes cost countries near about 3% of their total national product.

It has also evident from some of the reports that road traffics have been neglected from the global heath agenda for many years, although it was predictable and somewhere preventable. More than 90% of deaths and related disability resulted from road traffic incidents are seen in the low or middle income countries. These statistics are highest in the low and middle income countries of African region. Also in high-income group, people from low socio-economic backgrounds are more likely to be involved in a road traffic injury incident.

## MARKET CHALLENGES

**High cost of cosmetic dental procedures**

Cosmetic dentistry is the focus area in the field of dentistry which enable a patient to have a perfect and confident smile. Cosmetic dentistry includes any dental procedure that improves the appearance of an individual's teeth, gums or bite. It primarily deals with the aesthetic part of the oral health which includes shape, size, position or appearance of the dental structures.

However, these cosmetic dental procedures are relatively high in price and some of these procedures are much costlier. Cosmetic procedures can get more expensive depending on the required treatment and the nature of the procedure. Adding to this, dental insurance does not cover the cosmetic dental procedures for most of the part.

It has been reported that many American families have skipped a visit to a dentist's clinic because of the high cost of the dental care facilities and the numbers of these families are continuously been increasing. According to a research, in 2007 just slightly more than half of the Americans had dental insurance. Reason behind this was sought to be the skimpy coverage of the insurance plans which includes only routine check-ups and cleaning.

A study revealed that one in four non-elderly American have untreated tooth decay and only 36% of all adults in the United States are expected to visit a dental office which partially explains how expensive dental care has become for Americans.

Another issue related to it is lack of transparency in the price charges in dental procedures. People are afraid to visit a dentist from not knowing the costs of treatment. This has led to high out-of-pocket expenditure for typical patients as knowing exactly in advance the total amount to be paid in a dental procedure is quite difficult.

**Changing behavior of patients towards availing dental treatment**

The utilization of dental care is changing. The rate of adults who visit a dental practitioner has been dropping for the past decade among all salary groups, especially among poor adults. On the other hand, the 2000s really observed surprising additions in the percent of youngsters in the United States who see a dental practitioner, driven by development of open programs.

The prevalence and severity of dental caries in permanent teeth has declined in the course of the last quite a few years. In 1970s adults aged 6- 18 years had at least their four tooth decayed, however by the mid 2000s that had reduced to less than 2 teeth with decay. The coming generation of youngsters, particularly with increasing family income, will have less decayed tooth and will require less perplexing remedial dental care as they age.

In the recent past people have become more aware and they have started availing preventive measures and are more concerned towards their oral hygiene. Since a higher extent of the population are having other dental problems like deposition of plaque and calculus as they age, there might be an expanded requirement for periodontal care, the treatment for the same can be given by a dental hygienist rather than a dental specialist.

The example of changing utilization of dental care are anticipated to drive down general dental spending which may affect the growth of the dental restoration market.

## MARKET TRENDS

**Increasing demand for advanced cosmetic dental procedures**

Cosmetic dentistry is the recent trend in the field of dentistry which enables the dental restoration material market to grow at a very fast pace in the coming days. Cosmetic dentistry is used generally to address any dental procedure that improves the appearance of an individual's teeth, gums or bite. It primarily deals with the aesthetic part which includes colour, position, shape, size alignment and overall smile appearance.

There has been an increased demand for the cosmetic dentistry in the recent times which is well responded by the practitioners in providing the same facilities to the patients. Patients may have many queries regarding their dental appearance like, could their smile be brighter or is it possible to get their discoloured tooth look normal or to get their chipped, broken or misshaped tooth back to its normal shape.

These queries can be very well answered these days with improved cosmetic dental procedures. These procedures can make these kinds of treatment possible which would also be quick and relatively painless.

Some of the procedure includes bleaching, which lightens the teeth that have been stained or discoloured by the age factor or food. Another procedure is the application of composite resins which are used to restore the broken or chipped tooth structure. It can also be used to fill the gap between two tooth structure and even cover the exposed root surfaces as a result of gum recession.

Overcrowded or misaligned tooth can be placed at their appropriate position to a great extent by a procedure known as enamel shaping or cosmetic recontouring. For example, if a tooth appears to be much longer or wider than the rest, some part of that tooth structure can be removed with the subsequent application of cosmetic materials.

Recent advances in orthodontic treatment like invisible brackets and wires are creating a trend which is allowing more patients to avail more of these cosmetic dental procedures.

**Increasing public awareness towards availing dental treatment**

Public awareness towards dental treatment is the deciding factor for the dental restorative material market to grow. Oral health is an important part of overall general health and wellbeing. Many studies have proved that good knowledge of oral health and practices have resulted in the good maintenance of oral health.

Oral hygiene is compromised by the use of unhealthy behaviour and habits like use of tobacco and cigarette smoking which may lead to serious diseased conditions.

Oral diseases have been a remarkable health problem worldwide, with almost every person facing dental problem at least once in their life time. It has been reported that the deposition of plaque and calculus with increasing age among children and adolescent is one of the major factors contributing to the poor oral health. Poor oral health affects an individual's general health, wellbeing, education and development of children and their families. Chronic oral infections can lead to pose a risk for diabetes, cardiovascular and respiratory diseases and low birth weight etc.

So, taking all these points in consideration, the population have become more aware about the consequences of the carelessness regarding availing a necessary dental treatment. In earlier days, people were not aware which reflects their low participation in availing dental restoration procedures.

According to a study, there were 25.4% persons with untreated dental caries in United States during 1988-1994, which reduced significantly to 18.9% during 2011-2012.

**Continuous improvement in technology**

advancements in new dental innovation offer better answers for traditional oral medical care issues than any time in the recent past. The trend in dentistry is using innovation to make dentistry more agreeable, solid, proficient and natural looking for the patient as possible. Patients and their dental specialists are taking advantage from newer technologies that are less invasive but rather more reliable than the times of past. Procedures that some time ago took multiple appointments to the dental practitioner or required more than one specialists can frequently be performed in the solace of one appointment by one qualified professional.

It is an increasing trend for the patients which allows them to avail the dental treatment facilities without any discomfort. various dental equipment and devices has been developed which has made dental procedures very comfortable for the patients and very handy for the professional.

One of those technologies include using lasers to detect dental cavities. Diode lasers have been used and gained popularity in the last decade, but recently these lasers have been used to detect small or tiny dental cavities restricting them to be a big matter of concern for the patient. Healthy tooth does not react to the laser light while the decayed part will glow upon illumination.

Air abrasion is another latest technology which is considered as a great dental advancement over the conventional dental drill as it allows exact and safe removal of decayed part of the teeth without application of local anaesthesia. This system makes use of blasts of pellets of air and aluminium oxide to treat the decayed condition such as cavities.

Another is intra-oral camera which allows dental professional to view the oral health of a patient more precisely and accurately. It allows a closer view of structures, may it be cavities, plaques, calculus or filled restorations. It is important for patient education, better case acceptance and improved patient acceptances.

## COMPETITIVE LANDSCAPE

The global dental restoration market is characterized by the presence of established players, such as 3M, GC Corporation, Dentsply Sirona, and Ivoclar Vivadent. These companies are focused on the development of innovative, flexible applications and user-friendly products. Other key companies such as VOCO, Kerr Corporation, and Kuraray Noritake Dental are competing with these companies in the market by offering competitive products at cost-effective prices.

The market is fairly competitive as several regional players are competing with the established players. Regional players can provide their products at lesser prices as compared with the global companies, creating a consistent competition in the low-end markets.

The Tier 1 players invest in product development and expansion of their businesses to other regions. They invest in R&D to expand their product lines. 3M, GC Corporation, Dentsply Sirona, and Ivoclar Vivadent are continuously adopting new technologies to strengthen their presence in the market.

| | Products | R&D strength | Future strategy |
|---|---|---|---|
| 3M ESPE AG | Cements, composites, liners | $1.8 billion spent in 2015 | Innovation<br>Organic growth through acquisition |
| GC Corporation | Cements, composites | A significant part of revenue used for R&D | Collaboration with organisations, like dental schools and associations |
| Ivoclar Vivadent | Amalgam, cements, composites, ceramics | Has a dedicated team of around 170 experts in their R&D department | Continuous innovation<br>Has its own subsidiaries in 24 countries which enables them to operate more effectively |
| Dentsply Sirona | Amalgam, composites, cements, liners | Spends $125 million annually to advanced dentistry | Dentsply Sirona Academy educates over 350,000 professionals annually<br>M&A for technology and product development |

3M is the leader with a wide range of products for dental restoration, expanded geographic footprint as well as increased focus on innovation and organic growth strategy.

## 3M ESPE AG

The company was founded in 1947 and is based in Seefeld, Germany. 3M ESPE AG operates as a subsidiary of 3M Company.

3M ESPE AG manufactures and markets dental products. The company offers adhesives, composites, curing lights, glass lonomers and liners, cements, impression materials and equipment, and face masks and sterilization equipment. The company also offers dental services. The company was formerly known as ESPE Dental AG and changed its name to 3M ESPE AG in October 2000.

### Key highlights

- March 16 2017: 3M has announced that it has entered into a definitive agreement to acquire Scott Safety from Johnson Controls for a total enterprise value of $2.0 billion.

- January 31 2017: 3M is being recognized with the prestigious 2017 Catalyst Award, which honors companies for their proven approach to expand opportunities for women and business.
- November 10 2016: 3M Introduces New Assay for Molecular Detection of Cronobacter.
- October 11 2016: 3M Health Information Systems, and Verily Life Sciences, an Alphabet company,j announced that they have entered into a strategic agreement to develop new population health measurement technology for managing clinical and financial performance.

**Strength**

- Total revenue of $30.3 billion in the financial year 2015.
- 3M has 90,000 employees with operations in more than 70 countries, 55,000 products sold across more than 200 countries.
- $1.8 billion expenditure in research and development in the year 2015.
- Earnings rose to $7.58 per share, a 1.2 percent increase year over year.

**Strategy**

- Building on long-standing leadership in environmental stewardship and commitment to customer-inspired innovation, focusing on Sustainability strategy on overcoming the global challenges that serve as barriers to improving life.
- Consistently delivering new ideas and innovation.

**Opportunity**

- In 2015, 3M has invested in a new brand platform known as 3M Science-Applied to life which has enhanced the use of science to solve problems related to the customers
- 3M's strong balance sheet and liquidity provide the Company with significant flexibility to take advantage of numerous opportunities going forward.
- 3M has invested nearly $4 billion in acquisition in the year 2015 which complement organic growth of the company.

## GC Corporation

The company was founded in 1921 and is based in Tokyo, Japan with subsidiaries/sales offices in Japan and internationally. It also has manufacturing plants in Belgium, the United States, and China.

GC Corporation manufactures and sells oral health care materials, and related device and equipment. The company's dental materials include glass ionomers, crown repair materials, luting/adhesive materials, restorative materials, impression materials, waxes, stones/investments, denture base resins, other resins, artificial teeth/porcelain, dental alloys, abrasives/burs, root canal instruments, hand instruments, preventive products, infection control related products, tooth whitening systems, tooth creams and brushes, other materials, and related devices; and dental equipment comprises dental units, X-ray units, dental cabinets, occlusal force measuring systems, CO2 laser units, LED visible light curing units, and other products.

**Key highlights**

- November 29 2016: GC was ranked No.1 in the 9th Quality Management Level Research 2016 conducted by the Union of Japanese Scientists and Engineers (JUSE) and sponsored by Nikkei Inc.
- October 7 2016: GC has acquired all outstanding common stocks of Showa Yakuhin Kako Co., Ltd. from investment funds advised by Unison Capital, Inc.

**Strength**

- GC corporation has complete focus to deal only in dental products and has a wide range of products.
- 600 types of products and selling them to more than 100 companies around the world with more than 2,600 employees worldwide.
- GC Corporations has a brand identity and is renowned in almost every part of the world.

**Strategy**

- GC works and collaborates closely with other organizations, such as dental schools and associations, to achieve the common goals. In 2015, FDI and GC launched the joint project Oral Health for Ageing Populations (OHAP).
- At Tohoku University in Japan, the Department of Next Generation Dental Materials Research has been established by GC with the aim of realizing the dream of a healthy and long-living society.

**Opportunity**

- GC’s three main production centers have all acquired ISO 13485 certification. Moreover, the company is becoming increasingly well known in the global marketplace for the high quality of its products.
- GC Corporation has actively participated in each countries dental industry association which has improved its opportunities.
- GC Corporations has indulged in mergers and acquisitions and continuously dedicated to bring about new and innovative products.

## Ivoclar Vivadent AG

The company was founded in 1923 and is headquartered in Liechtenstein.Ivoclar Vivadent AG was formerly known as Ivoclar AG and changed its name to Ivoclar Vivadent AG in 2001.

Ivoclar Vivadent AG provides products and systems for dentists and dental technicians. It offers adhesives, ceramics, alloys, chairside CAD/CAM blocks, clinical accessories/instruments, core build-up solutions/endodontics, equipment, impression materials, luting materials, metal-ceramics, prevention/care solutions, removable denture prosthetics, resin-based veneering and CAD/CAM materials, restorative materials, and temporary materials. The company sells its products worldwide.

**Key highlights**

- March 20 2017: Digital dentures-Users can now avail themselves of a quick and reliable digital method to create monolithic dentures that are both esthetic and of high quality.
- March 17 2017: Ivoclar Vivadent files complaints against GC Corporation and GC America.
- November 4 2015: Ivoclar Vivadent announced that it will dismiss a lawsuit it filed against Heany Industries, Inc. after executing a settlement and license agreement with Heany Industries.

**Strength**

- Net revenue of $781.64 million in the year 2016.
- Products are shipped to 120 countries with dedicated efforts of 35,000 employees.
- Ivoclar Vivadent has a dedicated team of around 170 experts in their research and development department, committed to develop integreting concepts.
- Ongoing further education and training is another factor for their excellence.

**Strategy**

- Ivoclar Vivadent strategy includes quality product development with innovation which results in the sales growth of 2.1% in the year 2016.
- To keep their development geared towards the need of the patient driven through technical feasibility, market orientation and experience.

**Opportunity**

- In the recent past there have been a constant growth in the number of employees in Ivoclar Vivadent globally which is an indicator of better growth opportunities.

- Ivoclar Vivadent has its own subsidiaries in 24 countries which enables them to operate more effectively meanwhile providing better opportunities.

## Dentsply Sirona

Dentsply Sirona designs, develops, manufactures, and markets various dental and oral health products, and other consumable healthcare products primarily for the professional dental market worldwide.

The company provides dental consumable products, including endodontic instruments and materials, dental anaesthetics, prophylaxis pastes, dental sealants, impression materials, restorative materials, tooth whiteners, and topical fluoride products; and small equipment products comprising dental hand pieces, intraoral curing light systems, dental diagnostic systems, and ultrasonic scalers and polishers.

**Key highlights**

- January 2 2017: Dentsply Sirona and the University of Pennsylvania School of Dental Medicine form four-year collaborative partnership.
- December 5 2016: Dentsply Sirona Launches New Intro Kit to Complement Recent Successful Launch of Aquasil Ultra+ Smart Wetting Impression Material

**Strength**

- In the year 2015, net revenue was around $4 billion.
- Operates through more than 120 countries with a strength of more than 15,000 employees worldwide.
- Company spends around $125 million every year to advanced dentistry and have a large R&D platform with over 600 scientists and engineers.
- Dentsply Sirona Academy educates over 350,000 professionals annually in almost 11,000 courses in over 80 countries.

**Strategy**

- Strategy includes direct investment in product development and improvement which would lead to the goal as a leader.
- Investing in activities through acquisitions, by entering into licensing agreements with third parties.
- Capturing market dominance by purchasing technologies developed by third parties.

**Opportunity**

- In September 2015, Dentsply had a merger agreement with Sirona, which greatly increased the opportunities for the company.
- The dental industry or market is highly competitive providing companies opportunities to develop new and unique products with innovation.
- The need of good quality products and the growing incidences of dental problem is a potent opportunity for the company.

**Other players:**

| Companies | Description | Strength | Strategy | Opportunity |
|---|---|---|---|---|
| **VOCO gmbh** | VOCO gmbh is a manufacturer of dental products and it exports to more than 100 countries. Product includes direct and indirect | Continuing research and development expenditure for the product innovation among its direct and indirect restorative materials. | Manufacturing quality products subjected to thorough monitoring with intensive testing and a certified quality management system. | New product innovations, merger and acquisition opportunities within the targeted market. |

| Companies | Description | Strength | Strategy | Opportunity |
| --- | --- | --- | --- | --- |
| | restorative materials. | | | |
| **Kerr corporation** | Kerr Corporation produces and supplies dental products. The Company offers fillings, adhesives, bone grafting material, adhesive resin cement, composites, curing lights, impression material, and other dental products. Kerr serves clients worldwide. | Wide range of products with product innovation. | Finding out the user and customer needs, meeting regulatory requirements, and bring about innovation and excellence in every product. | Recently Kerr corporation has partnered with DRNA to support dental practices through information, training, documentation and equipment. |
| **Kuraray Noritake Dental** | Kuraray Noritake Dental is a manufacturer of dental products, | Kuraray Noritake Dental has a very strong distribution network with | To excel in the areas of development, production, sales and strengthening | Worldwide progression of aging and changes in disease structure, as |

| Companies | Description | Strength | Strategy | Opportunity |
|---|---|---|---|---|
| | especially dental bonding agents and composites. | distributors in all major countries. | their presence in the Japanese and global markets. | well as the diversification of patients needs provides opportunities. |

## RESULTS

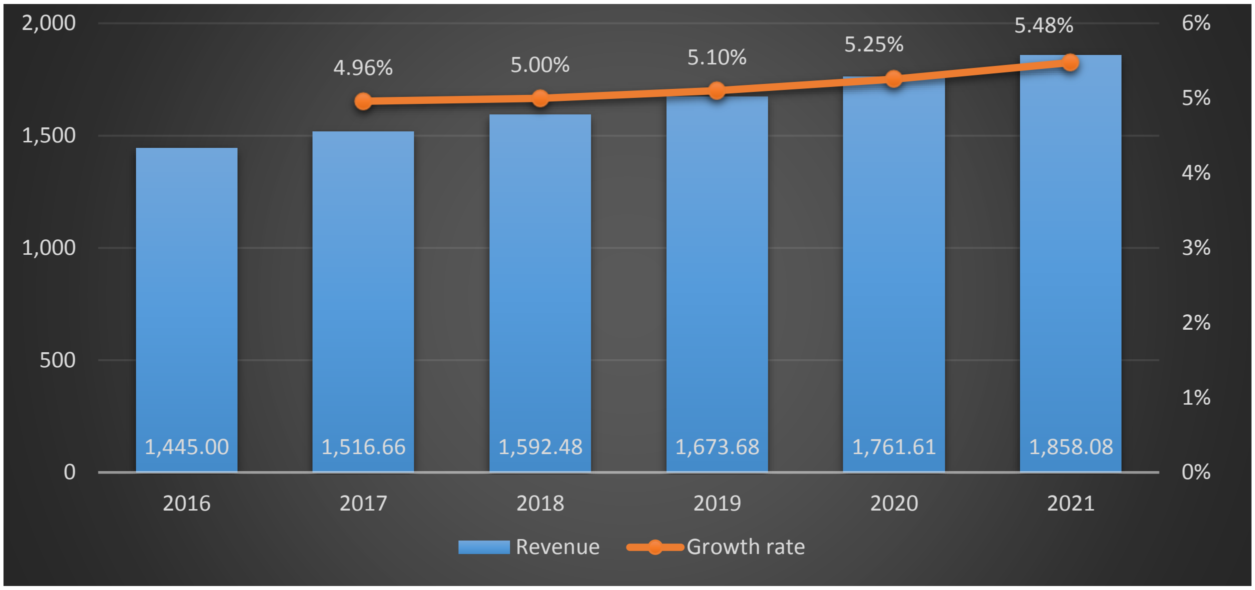
In 2016, the Americas dominated the global dental restorative material market with a share of 47.54%. The US was the highest revenue contributor to the market in this region. An increase in the number of dental caries and increased number of accidents have contributed to the growth of this market in the region. Product innovation and technology and the awareness regarding dental treatment contributed to the market growth in the US. Dental restoration material manufacturers operating in the US are focusing on product innovation and quality of the product to increase their market shares.

The Americas was followed by EMEA with a share of 30.52% in 2016. The UK, Germany, Italy, Spain, and France were the major revenue contributors to the market in EMEA. Growing older population in Europe has led to a rise in the number of dental procedures.

Rigorous online marketing strategies and promotional activities by vendors will contribute to the growth of the market.

In 2016, APAC accounted for 21.94% share of the global dental restorative market. Technological innovations, growing medical tourism, and improvements in healthcare infrastructure drive the market. Emerging market conditions has provided many opportunities to the companies which are already prevalent in the market and new entrant as well. Local manufacturers in APAC are offering low-cost products, posing a threat to global vendors. Developing countries such as China, India, Thailand, Singapore, and South Korea are witnessing rapid growth in the medical disposable device market and are likely to witness significant growth during the forecast period.

**Global dental restoration market 2017-2021 ($ million)**




The Global dental restoration market size in 2016 is estimated at $1445 million which is expected to reach at $1858.08 million at a CAGR of 5.16% during the forecasted period.

# GEOGRAPHIC SEGMENTATION

## AMERICAS

**Market outlook**

- North America is likely to hold the largest share of the market during the forecast period.
- High incidences of dental caries and an increase in road accidents have greatly contributed to the market.
- Private health insurance coverage seems to lower the out of pocket expenditure to individuals for availing health and dental services.
- By 2020, the number of Americans aged 65 and older is expected to rise by 35 percent, which would further contribute in the growth of the market.

**Players in the market**

- 3M ESPE AG
- Dentsply Sirona
- GC Corporation

**Market opportunities**

- The number of people with private health insurance is expected to increase as a health insurance exchange is planned to be initiated as part of the Protection and Affordable Care Act (PPACA).

**Market risks**

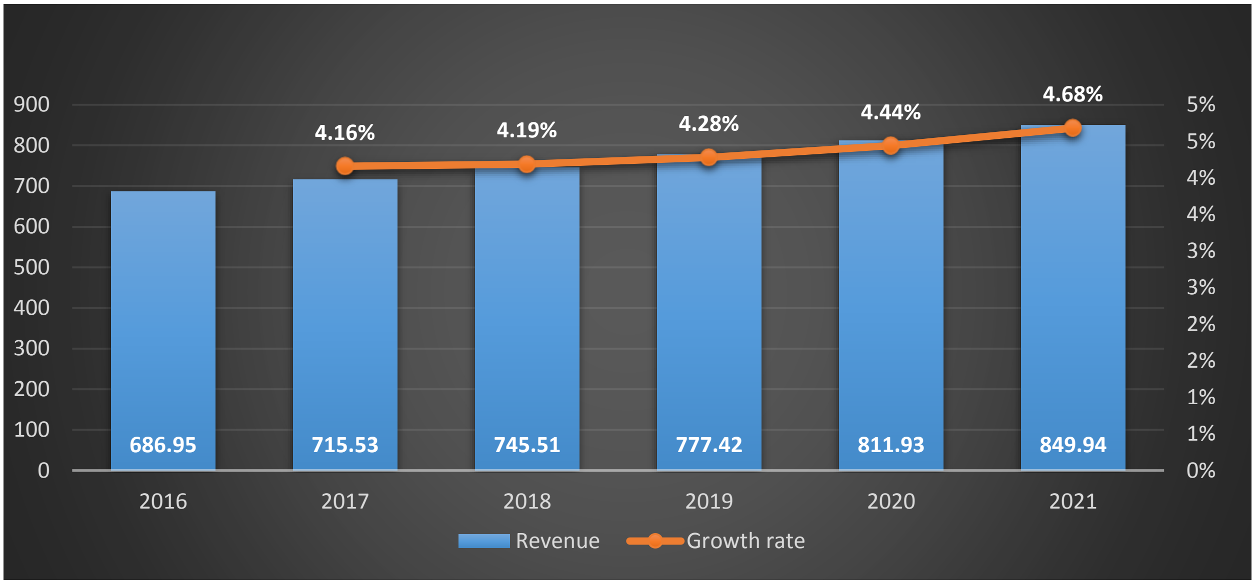
- Changing laws and regulations .

### Market size and forecast

The Americas dental restoration material market has proven to be quite resilient in the recent past, having registered positive revenue growth each year and is expected to grow at a decent pace during the forecasted period.

North America is likely to hold the largest share of the market during the forecast period owing to the high incidences of dental caries and an increase in road accidents. The market in North America is dominated by big companies like 3M ESPE AG and Dentsply Sirona who are the major manufacturers of dental restorative materials. These companies sell their products through their strong network channels scattered all over the globe.

**Global dental restoration market in Americas 2017-2021 ($ million)**




The market is expected to grow from $686.95 million in 2016 to $849.94 million in 2021 at a CAGR of 4.35% and it accounts for 47.54% of global dental restorative materials market share.

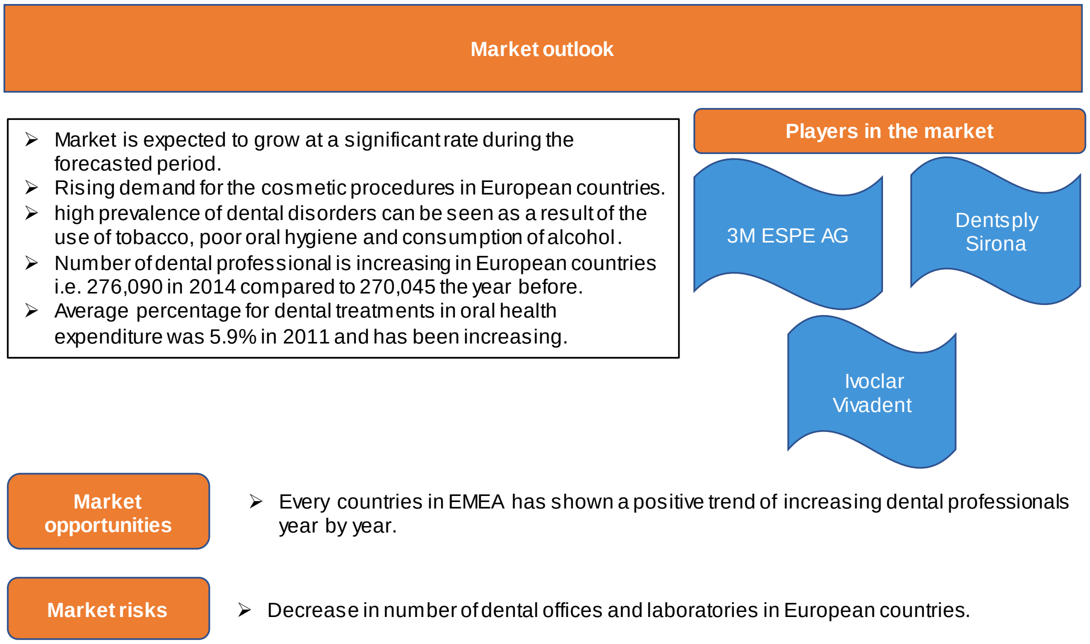
Private health insurance coverage seems to lower the out of pocket expenditure to individuals for availing health and dental services. While lower costs are driving demand for dental services, the fees collected from dental insurance carriers are often less than those charged to other customers.

The number of people with private health insurance has increased and is expected to increase further as a health insurance exchange is planned to be initiated as part of the Protection and Affordable Care Act (PPACA).

The exchange is supposed to create a more organized and competitive market for health insurance by offering a choice of plans, establishing common rules regarding the offering and pricing of insurance, and providing information to help consumers better understand the options available to them.

Adding to the growth opportunities of this market regarding the geriatric population, it has been estimated that by 2020, the number of Americans aged 65 and older is expected to rise 35 percent compared to just a ten percent increase in the overall population. Keeping the fact intact that as people age, their need of general and cosmetic dentistry increases.

# EMEA




### Market size and forecast

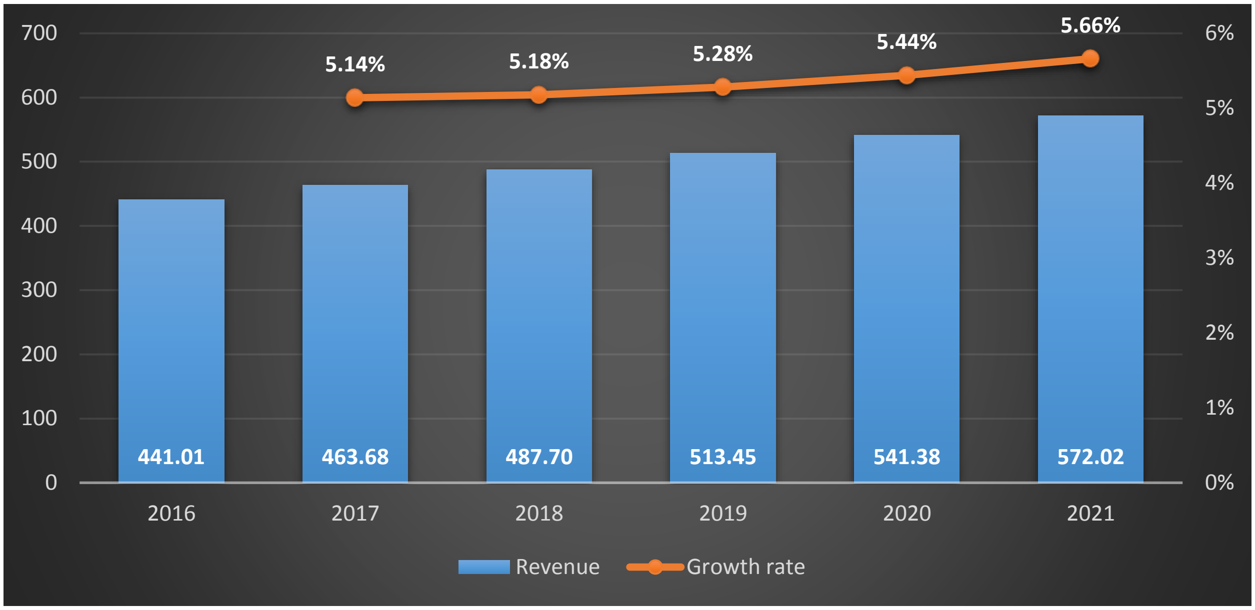
The dental restorative material market in EMEA is expected to grow at a significant rate during the forecasted period.

In European countries, there is rising demand for the cosmetic procedures as well as high prevalence of dental disorders can be seen as a result of the use of tobacco, poor oral hygiene and consumption of alcohol.

Average percentage for dental treatments in oral health expenditure was 5.9% in 2011 and has been increasing since then. Market of 40 million has been recorded for teeth whitening products.

Number of dental professional is increasing in European countries i.e. slightly increased to a total of 276,090 in 2014 compared to 270,045 the year before.

**Global dental restoration market in EMEA 2017-2021 ($ million)**




The market is expected to grow from $441.01 million in 2016 to $572.02 million in 2021 at a CAGR of 5.34% and it accounts for 30.52% of global dental restorative materials market share.

In Sweden, dental market has grown with a growth rate of about 9% between 2008 and 2011 with increasing number of patients developing a trend to move to private clinics.

In Norway, demand for sophisticated dental procedures are supported by the highest income groups. Here private investment was still limited.

In UK, a trend has been seen which points towards merging and concentrating in groups and a decrease in number of dental clinics was observed. Private dentistry has to compete here with NHS which provides free dental care.

Germany is the biggest market or contributes maximum share of dental restorative material market with annual growth of around 3%

However, a contrary trend showed, with decrease in the number of dental offices and dental laboratories. While the numbers of lab technicians remain constant, the total figures of labs in Europe has decreased in almost every surveyed country. With these figures it is suggested that growing numbers of practicing dentists indicates a developing trend to group practices or consolidation.

## APAC

**Market outlook**

- The dental restorative material market in APAC is expected to grow at a moderate rate during the forecasted period.
- The adoption of various cosmetic dental procedures in APAC countries lead to an increase in the market share.
- The market is expected to grow at a CAGR 6.23% during the forecasted period.
- APAC accounts for the lowest global market share i.e. 25.04% but has fastest CAGR.
- Market is driven by growing awareness of the patient towards dental treatment and the adoption of unhealthy practices.

**Players in the market**

3M ESPE AG

Dentsply Sirona

Ivoclar Vivadent

**Market opportunities**

- Emerging market conditions in APAC countries and high population in India and China.

**Market risks**

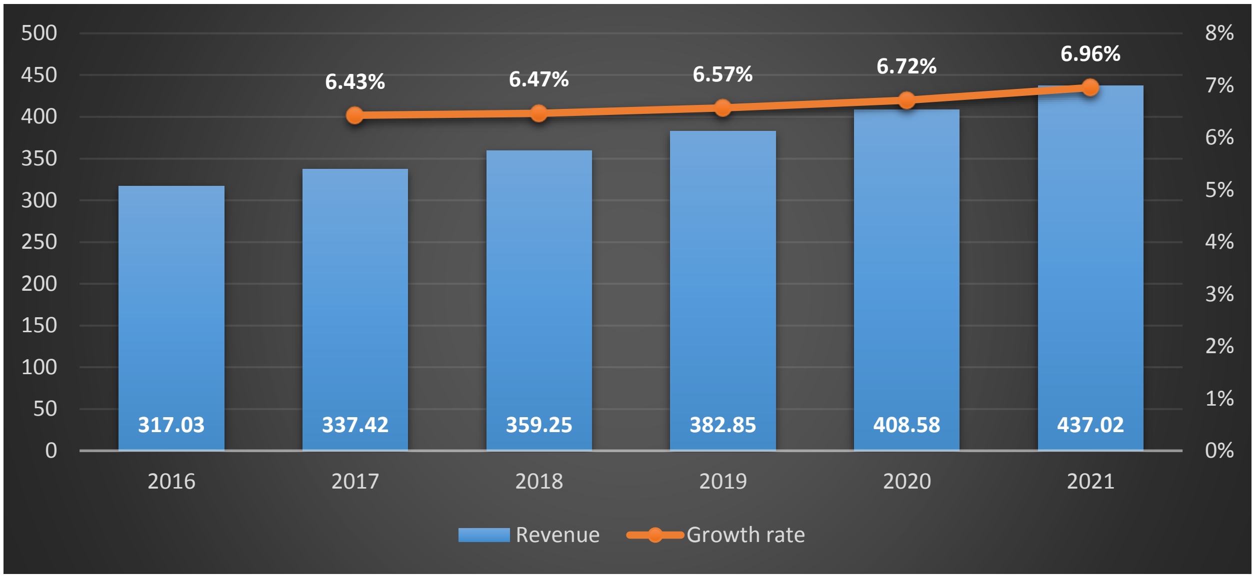
- Inadequate coverage of dental insurance in cosmetic dental procedures.

### Market size and forecast

The dental restorative material market in APAC is expected to grow at a moderate rate during the forecasted period.

The adoption of various cosmetic dental procedures in APAC countries lead to an increase in the market share. The focus is growing on innovation and user friendly products.

**Global dental restoration market in APAC 2017-2021 ($ million)**

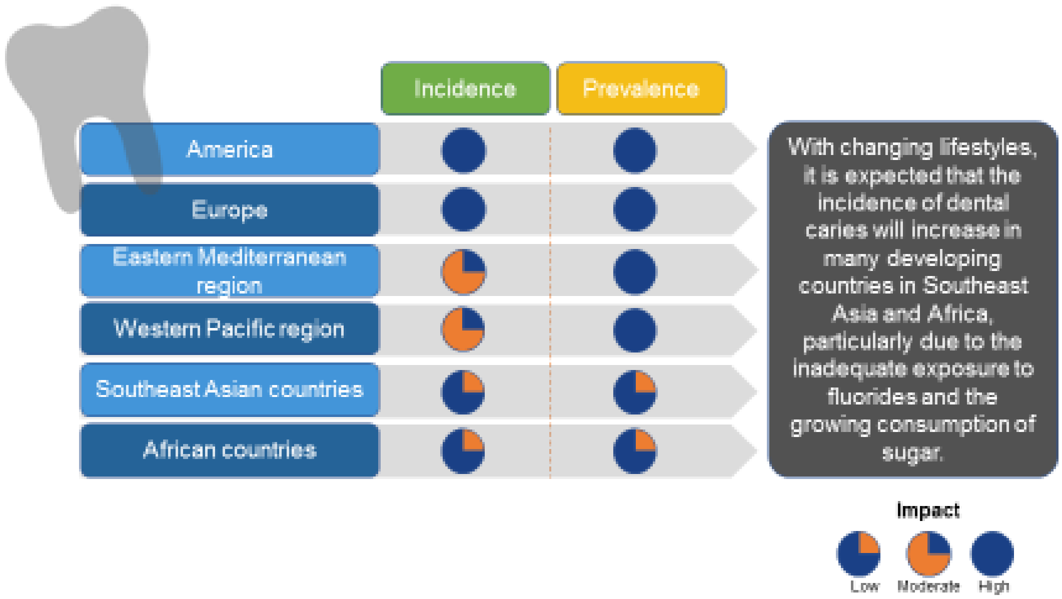



The market is expected to grow from $317.03 million in 2016 to $437.02 million during the forecasted period at a CAGR of 6.63% which is fastest among all regions. It accounts for 21.94% of global dental restorative materials market share.

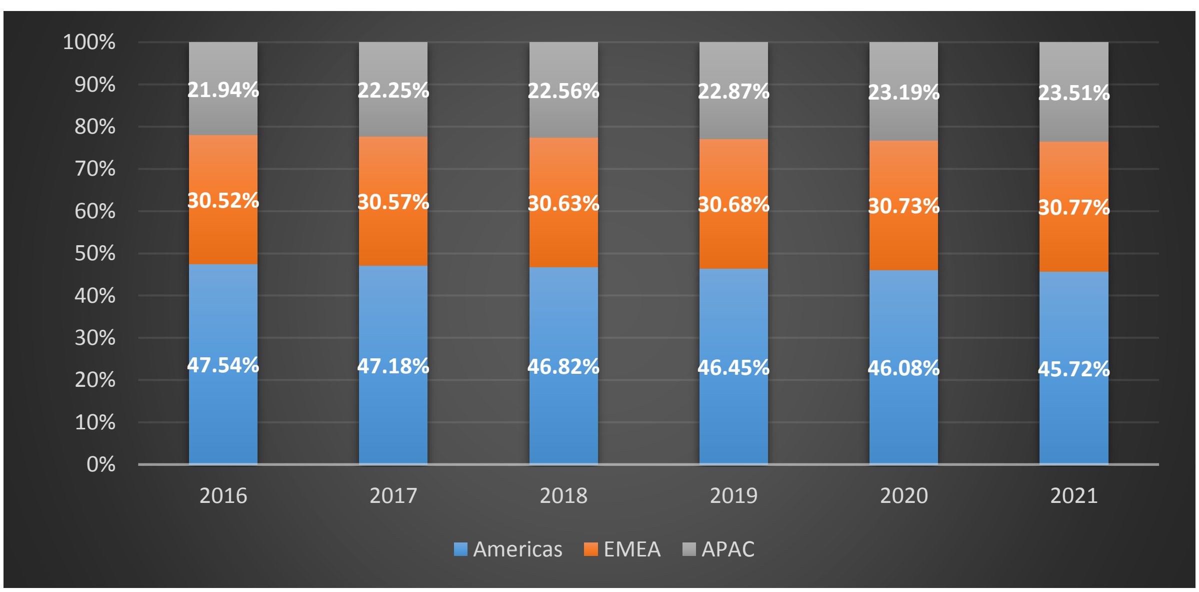
The market looks promising in this region due to the growing awareness of the patient. Patients are availing more dental treatments. Meanwhile, increasing use of tobacco products, unhealthy lifestyle, alcohol consumption and inappropriate dietary habits has led to increased growth in the dental restorative material market.

Another factor includes the emerging market conditions in Asia Pacific countries. Emerging market conditions in these countries provides a vast array of opportunities to market to grow.Some of the major players like 3M ESPE AG, GC Corporation and Ivoclar Vivadent have already dominated the market but in emerging market conditions new entrant can also compete with the dominators.

With the encouragement of dental tourism in these countries, a significant rise in the growth of this market is anticipated which is also coupled with high population of China and India.

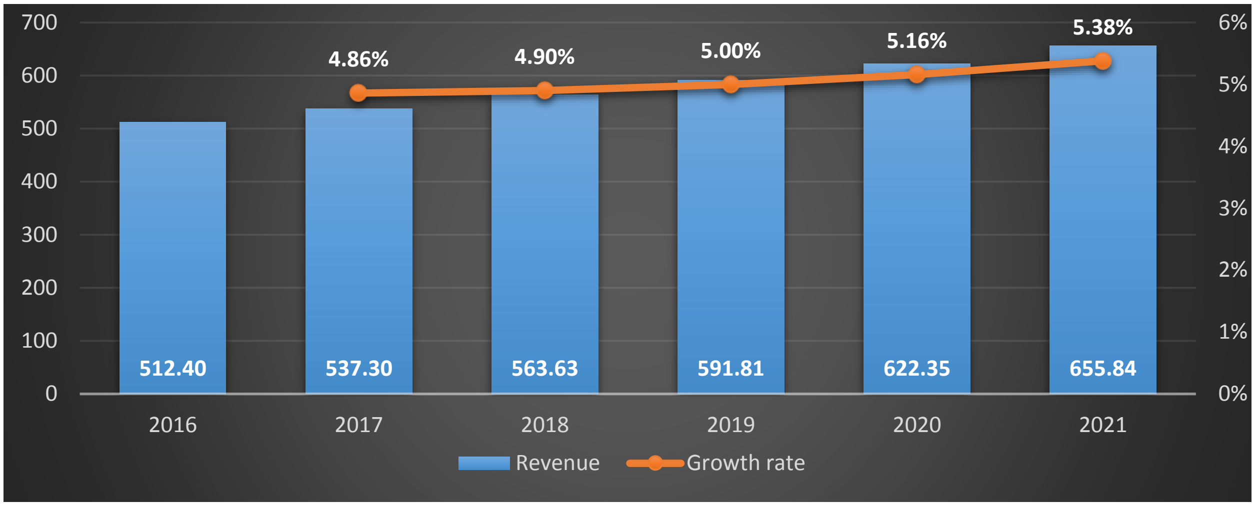



**Global dental restoration market geographic segmentation 2016-2021**



## Product segmentation

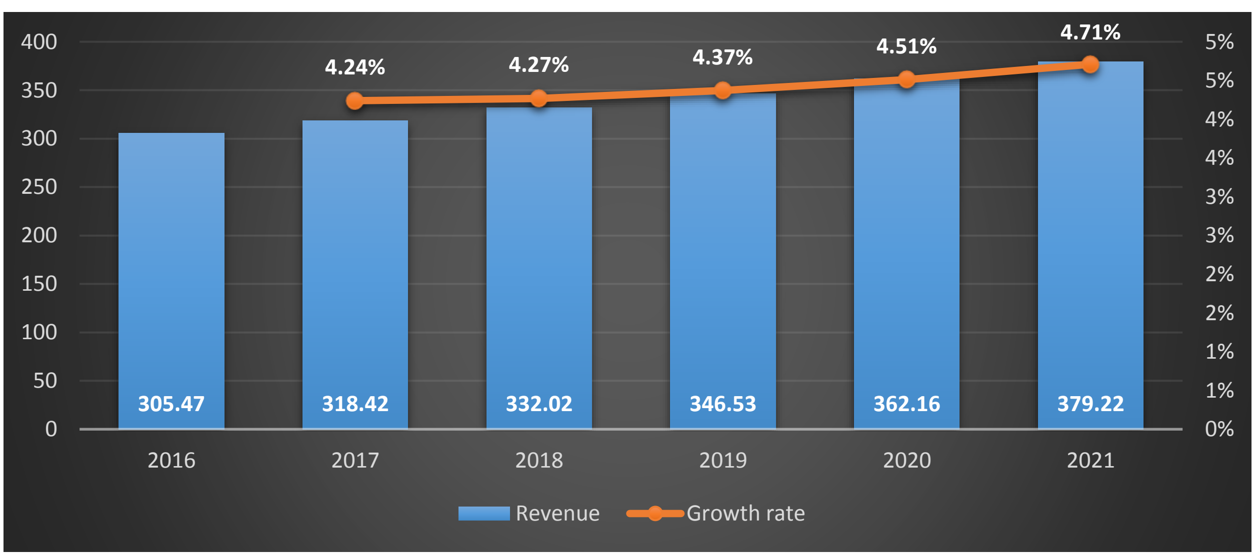
### Dental amalgam market size and forecast ($ million)




The market is expected to grow from $512.40 million in 2016 to $655.84 million in 2021 at a CAGR of 5.06%.

Dental amalgam is a commonly used restorative material worldwide and shares about 35.46% of the global dental restorative material market.

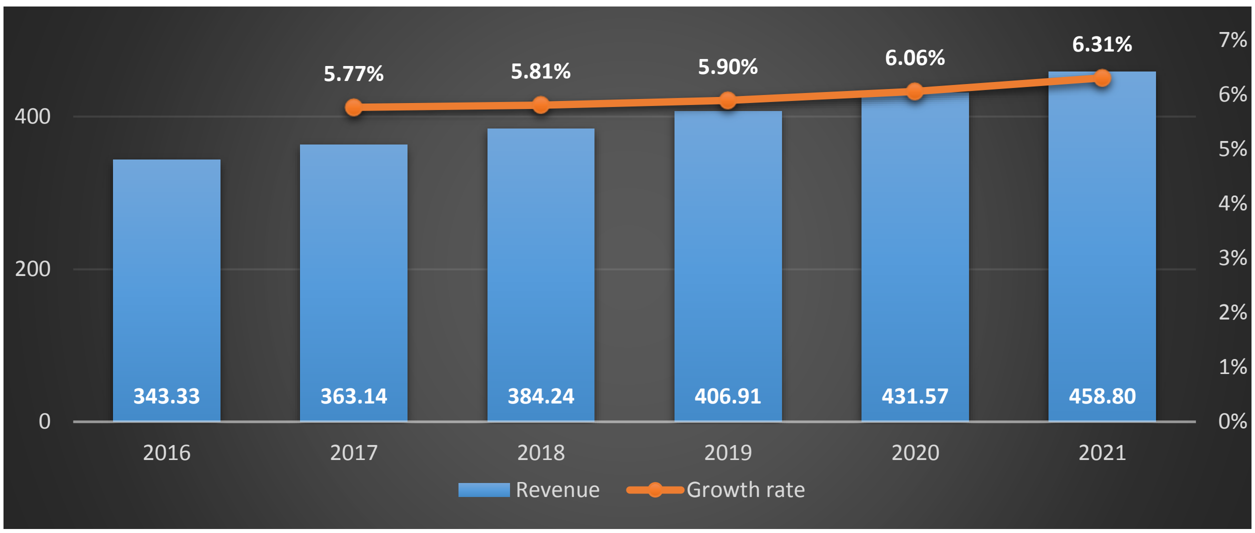
### Dental cements market size and forecast ($ million)



Dental cements are most widely used restorative material which accounts to 21.14% share of the total dental restorative material market.

Market share of dental cements was $305.47 million in 2016 which is expected to reach at $379.22 million during the forecasted period at a CAGR of 4.42%.

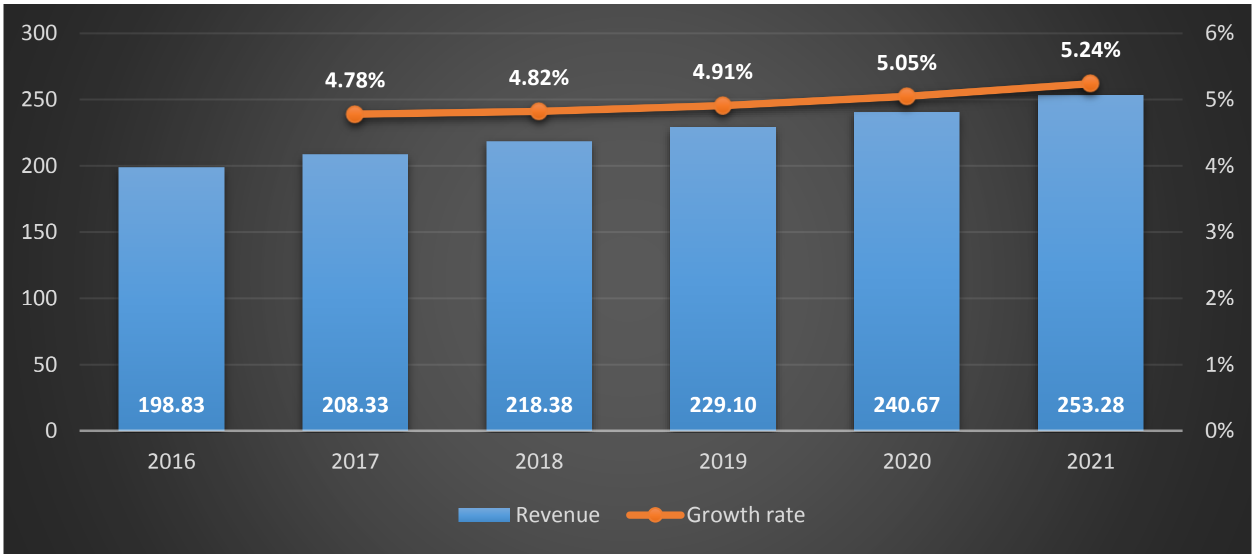
**Dental composites market size and forecast ($ million)**




Dental composites are known for their aesthetic properties as it matches with the tooth colour and is most frequently used restorative material in case of aesthetic concerns. It has 23.76% share of the total dental restorative material market.

Market share of dental composite was $343.33 million in 2016 which is expected to reach at $458.80 million during the forecasted period at a CAGR of 5.97%.

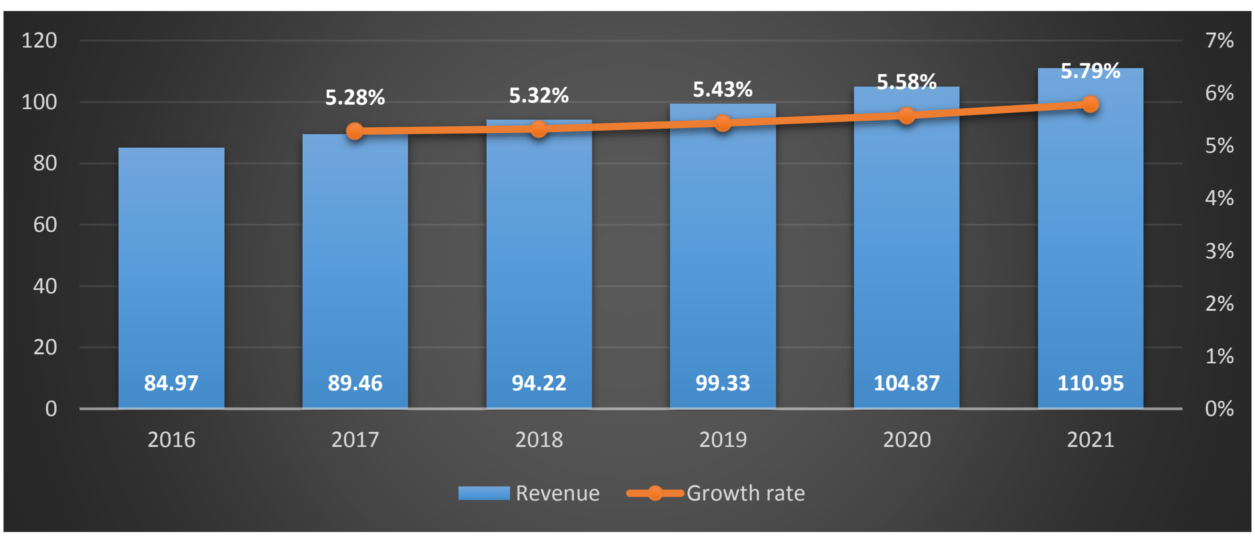
**Dental ceramics market size and forecast ($ million)**




Dental ceramics are used for fabrication of crowns and bridges owing to its strength as well as its aesthetic reasons and accounts for 13.76% share of the total dental restorative material market.

Market share of dental composite was $198.83 million in 2016 which is expected to reach at $253.28 million during the forecasted period at a CAGR of 4.96%.

**Dental liners market size and forecast ($ million)**

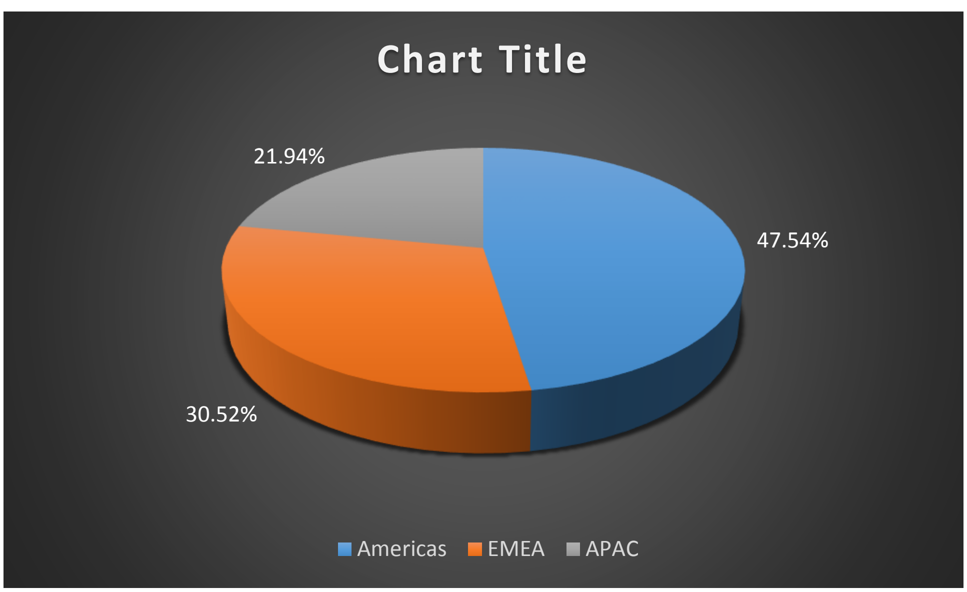


Market share of dental liners was $84.97 million in 2016 which is expected to reach at $110.95 million during the forecasted period at a CAGR of 5.48%.

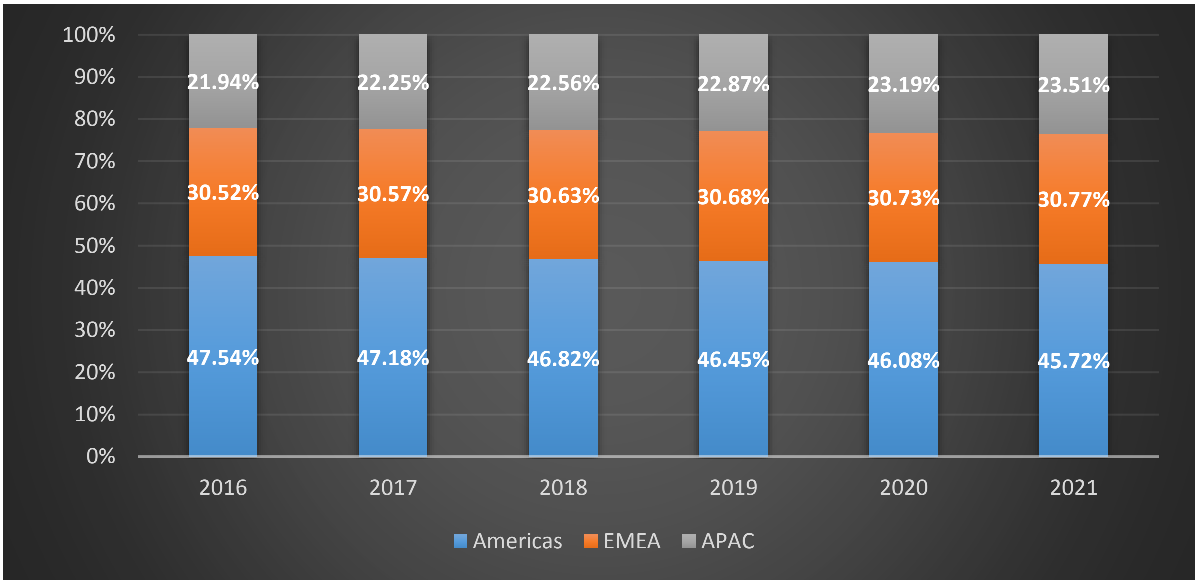
| | Dental Hospitals | Dental Clinics |
|---|---|---|
| Market share | **60%** High growth owing to increasing number of dental procedures, and support from government to both public and private dental hospitals. | **40%** Growing trend towards the adoption of personalised dental care to avail better services and treatment, individuals in emerging countries are preferring to opt for dental clinics. |
| Key trends | **Americas and EMEA:** Government partnership for funding to increase skilled dentists in the market. **APAC:** In emerging countries like China efforts have been made to increase dental hospitals by the government. In India, private dental hospitals are expanding at a decent pace along with the public hospitals. | **Americas and EMEA:** Advancement of technology in dental clinics like CBCT and 3D technology or advanced orthodontic braces have increased the popularity. **APAC:** Endorsement of brand by partnering with media partners and establishment of dental clinics through public or private investment. |
| Strategy | **Partnership with distributors:** To receive dental materials to be used in appropriate time frame it is essential for dental hospitals to have partnership with the distributors. It would also allow hospitals to receive the latest product available as soon as possible. | **Dental insurance coverage:** Dental clinics have entered into collaboration with insurance companies in order to provide dental coverage. The high procedure cost and inadequate reimbursement policies have been a constraint in the dental services. |

## CONCLUSION

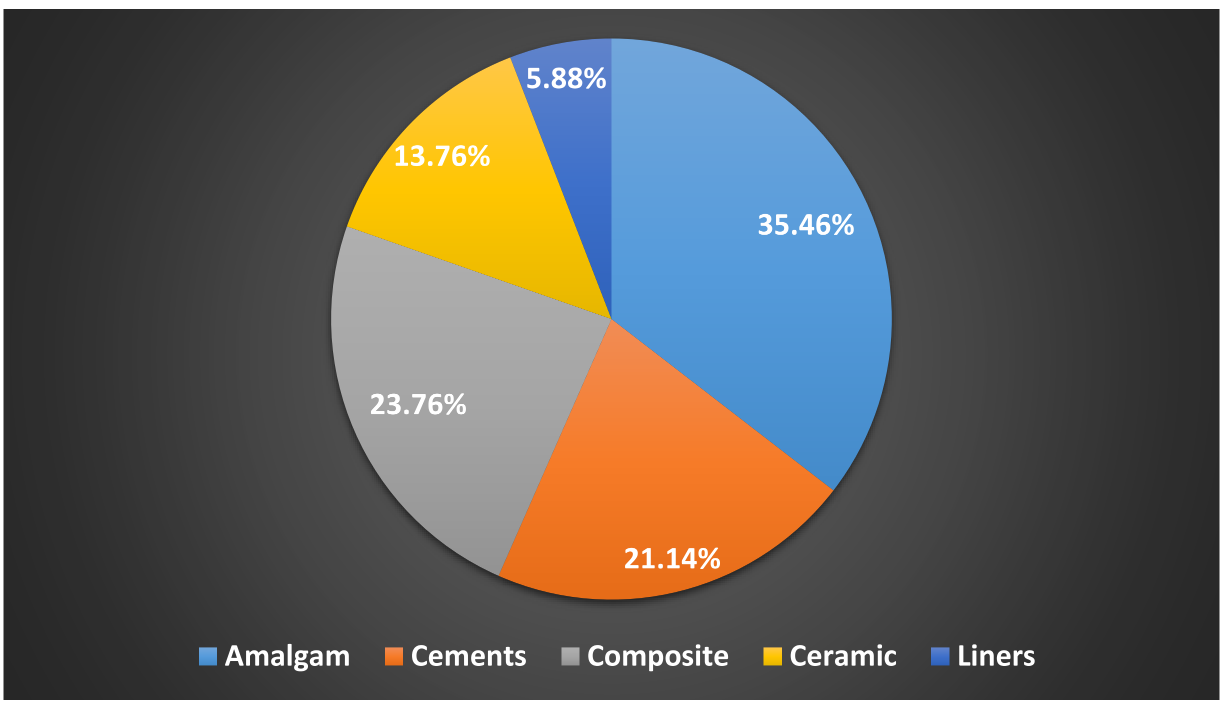
**Global dental restoration market geographic segmentation (2016) (%)**



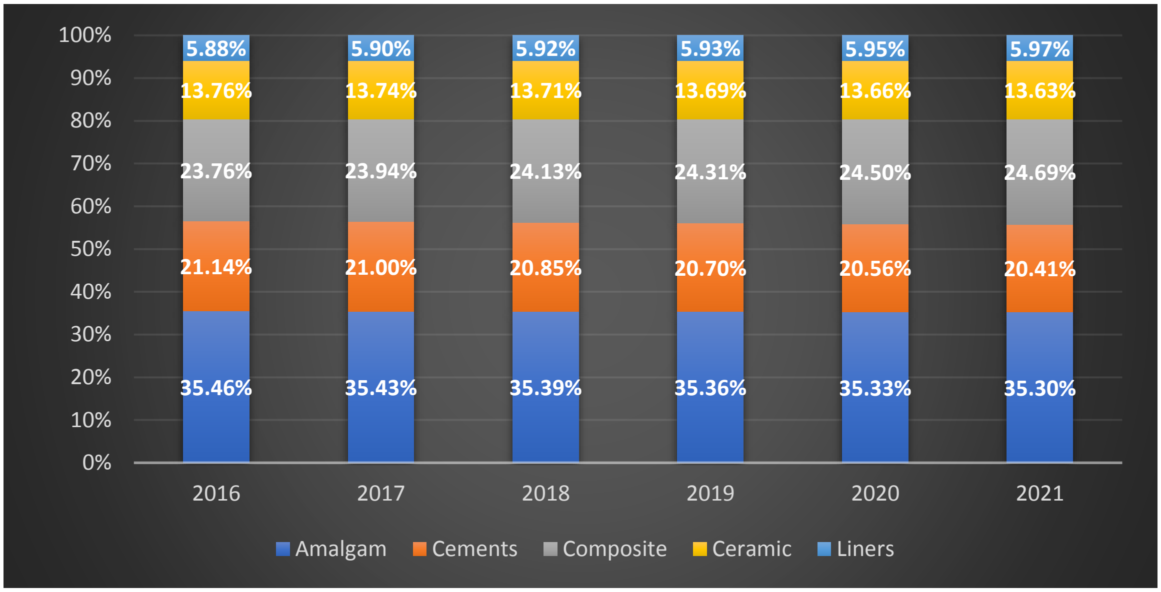
**Global dental restoration market geographic segmentation 2016-2021**




**Global dental restoration market product segmentation (2016) (%)**



**Global dental restoration market product segmentation 2016-2021**




Dental restorative material market is anticipated to grow at a significant rate during the forecast period because of the increasing carious condition and accidental cases.

The US was the highest revenue contributor to the market owing to the increase in dental caries incidences and road accident cases. Growing aging population being the most favoured driver in EMEA which is followed by the Americas in terms of revenue contributor. APAC has the least revenue contribution among these three but it has the fastest growing market owing to the emerging market conditions and high population.

In product segmentation, dental amalgam is the major revenue contributor followed by dental composite and dental cements. Dental liner is the least shareholder in this segment.

Dental composite is the fastest growing product in the market with highest CAGR owing to its aesthetic and durable properties.

## ANNEXURE

## QUESTIONNAIRES

1. We would like to know about **Dental restorative** product offerings in your company.
2. Could you please elaborate on some of the key products and services offered by your company?
3. In what way do your company's product offerings differ from those of your competitors?
4. Could you please mention some of the key end-user segments for your products and services?
5. What are the major parameters considered by the end users before buying?
6. How do you see this market performing in the next five years?
7. What are some of the key market dynamics that affect companies like yours in this market?
8. What will be some of the trends that will have an impact in the market in the coming years?
9. In terms of geographic split, which markets are growing and why?
10. Which of these regions is expected to witness fastest growth in the next five years? What could be its growth rate?
11. Could you please elaborate on the major drivers and restraints in the market? Do these drivers and challenges differ in each region? If yes which region is affected the most?
12. Is the market highly fragmented or dominated by top players?
13. Can you name some potential start-up players in this market who can give high end competition to the key players in the near future?
14. As regulations play a pivotal role in the Medical Device Industry, what are the challenges/hurdles you face
15. From regulations point of view?

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