Innovative Dental Materials and Devices for Health and Longevity

The Tokuyama Group provides products that help solve social issues. In the field of dental materials and devices, Tokuyama Dental Corporation, a group company, produces innovative products that contribute to prolonging a healthy life span.

40 Years in the Dental Materials and Devices Business

Tokuyama entered the dental market in 1978 in a joint venture established by Tokuyama Soda Co., Ltd. and Wada Precision Dental Laboratories Co., Ltd. in order to expand beyond the material industry and create new businesses. The new company focused on dental ceramics such as implant materials that can utilize inorganic chemical technology and moved into dental product areas. The joint venture merged into Tokuyama Dental in 2001 and, in March 2018, Tokuyama celebrated its 40th anniversary in the market for dental materials and devices.

Combining Diverse Technologies to Create World Firsts

Tokuyama Dental’s Tsukuba Research Laboratory is developing unique, world-leading products by combining technologies it has fostered, such as functional powder technology, molecular design technology, polymerization catalyst technology, surface modification and control technology, and biochemistry. In research and development, the ability to utilize the Group’s wide variety of technologies is a strength, and cooperation with R&D in different fields such as the environment, energy and ICT has become a springboard for new technologies. For example, the key technology of photo polymerization was developed and improved based on the catalyst technology developed at Tokuyama.

R&D requires expensive analytical equipment and advanced technology. Tokuyama Dental has a major advantage in having access to the equipment and talented employees of Tokuyama’s Analytical Science Department.

Key Technologies in Tokuyama Dental

- Functional molecular design technology
  - Adhesive monomers
  - Adhesive polymers
  - Irritation-free monomers
- Composite technologies
  - Functional powder technology
    - Spherical filler (sol-gel process)
    - Powder technology
- Polymerization catalyst technology
  - Photo polymerization catalysts
  - Chemical polymerization catalysts
  - Substrates
- Surface modification and control technology
  - Self-organizing technology
- Biochemistry technology
  - Antibody purification
  - Immunoassay

Kashima Factory—Production Technology Designed to Deliver Original Products

The majority of Tokuyama Dental products are manufactured at the Kashima Factory in Ibaraki Prefecture. These include supra-nano spherical fillers, a fundamental material used in resin composite (CR) for treating dental cavities. This material offers both gloss retention and strength, sustaining the gloss of the applied area while being resistant to external coloring and wear. The Kashima Factory employs advanced synthesis technology to manufacture uniform sized spherical fillers that are comprised of microscopic particles with an average size of 0.2 micrometers.

In order to ensure patient safety, the factory conducts manufacturing and quality control based on the ISO13485 quality management system. This includes implementing raw material acceptance and product specification tests, assuring that products are safe and secure. Since 1999, the Kashima Factory has also employed ISO14001-certified environmental management systems to reduce its environmental impact, including waste reduction and energy conservation.

Meeting the Needs of Dentists with Detailed Sales Activities

Tokuyama Dental sells its products to dentists through dealers. By providing feedback to the R&D department on the needs in dental clinical practice from dentist, dental technicians, and so on collected by the sales staff, the company has been able to develop products that meet the needs of its customers. The sales department is also building up the company’s reputation in the dental care market by establishing relationships with leading doctors and following up with study groups.

Dental disease such as cavities and periodontal disease can affect a person’s diet and social life, and impact their overall health. Maintaining dental and oral health is essential to living life to the fullest. Tokuyama Dental brings together the strengths of its R&D, manufacturing, and sales departments to provide innovative dental materials and devices.
One Shade to Match All Patients
—A Groundbreaking Solution

Tooth decay is normally removed by drilling, and the cavity is then filled with CR, which is in turn light-cured and finished. Since teeth come in many shades, dentists must stock various colors of composites to match surrounding tooth colors. Tokuyama Dental has achieved a major advancement in composite technology with the development of OMUNICHROMA, the world’s first dental restorative material that matches every tooth shade with a single composite shade. Released in the U.S. in February 2019 and in Europe in March, OMUNICHROMA has created a stir as a groundbreaking solution for dentists.

World’s First Smart Chromatic Technology

In order to color match the unique shade of a patient’s teeth, dentists using conventional CR must maintain an inventory of shades, and in the case of cosmetic dentistry, they must stock dozens. Tokuyama Dental’s CR product realizes a chameleon (shade-matching) effect by employing proprietary supra-nano spherical fillers, enabling a broad range of tooth colors to be matched with fewer shades. OMUNICHROMA with Smart Chromatic Technology takes this a step further by using a single composite shade to match almost any tooth.

Improving Development by Encouraging Young Researchers to Lead Research Themes

Kouichiro Hirata
General Manager
Tsukuba Research Laboratory
Tokuyama Dental Corporation

Integration of development, manufacturing, and sales is our company’s strength and enables us to develop innovative, world-leading products. In 2018, Tokuyama Dental filed 45 patents, evidence of our strong emphasis on patent filings. To encourage the development of new products, the Tsukuba Research Laboratory allows researchers to devote roughly 10% of their time to non-primary development themes without set goals. This encourages spontaneous ideas and enables teams to incorporate new insights freely. The environment empowers young researchers to display their abilities as theme leaders and gain experience by pursuing development to the stage where they get feedback from dentists, and this, in turn, fosters their marketing skills.

Aging demographics and digitization are two issues that need to be addressed in the field of dental care. There is a need to develop products that help extend the healthy life span of elderly persons, and a need to leverage digital technologies to develop products that lead to innovations in dental techniques. We promise to continue working to develop one-of-a-kind products that customers find truly satisfying.

OMUNICHROMA is groundbreaking—a win-win for all offices. No need to stock 30 composite shades that expire and take up space. So economical and it works great!

A Breakthrough Product Born of Serendipity

The secret to Smart Chromatic Technology lies in the physical phenomenon of structural color, which develops according to the structure of an object. The breakthrough came during the development of a new CR filler, when a prototype displayed undesired shades. Researchers realized the failure was caused by the effects of structural color, leading them to study the mechanism as an adjunct to their primary research. After overcoming a number of obstacles to commercialization, OMUNICHROMA was born.

Development of New Shade-Matching Technology for Composite Resins

Hironobu Akizumi
Manager
Tsukuba Research Laboratory
Tokuyama Dental Corporation

My co-researcher and I began developing OMUNICHROMA in 2009 while working to develop a CR for cosmetic restoration. During this development process we discovered that the particle size of the spherical filler gave color to the CR. We studied this phenomenon as a development sub-theme, thinking that there must be an application for the ability to take on various colors. Eventually, we developed a CR that generates red-to-yellow structural color and verified its broad shade-matching performance by filling artificial teeth of different colors. That was the moment that led to our breakthrough.

Dental restoration using CR is performed on a cavity that is formed after tooth decay.

Benefits of OMUNICHROMA’s Smart Chromatic Technology

Fill a cavity with OMUNICHROMA and once it is light-cured and finished, the filled area becomes the color of the surrounding tooth. OMUNICHROMA is the world’s first CR that matches the shade of the surrounding dentition. The red-to-yellow color generated by the spherical fillers combines with the reflected color of the patient’s surrounding dentition, creating the perfect match.

Proprietary Supra-Nano Spherical Filler

The filler material used as CR’s main component is crucial to the realization of OMUNICHROMA. While conventional fillers are made from rough, unevenly ground particles, OMUNICHROMA’s supra-nano spherical fillers are manufactured using a sol-gel method that produces microscopic, uniformly sized spherical particles from molecules. CR made from this filler is already highly regarded for its superior polishability, wear resistance, mechanical strength, and esthetic properties. Tokuyama Dental applied this technology to structural color and advanced it to create a new color-adaptation technology, resulting in OMUNICHROMA, a CR superior to other brands using ground particle fillers.

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