

**Speed film**

- b) accurate representations of bony defects detected by clinical periodontal charting
- c) often underestimated by 40-60 % due to thick cortical walls of bone
- d) easier to detect with digital technology but require more radiation exposure for the patient

- 4. Dental patients with periodontal disease *always* have more bone loss than is evident on full mouth radiographs.

a) True b) False

- 5. Filmless (digital) radiography can reduce patient radiation exposure by 30%.

a) True b) False

- 6. Cross-sectional radiographic images, ideal for dental implant treatment planning, can be achieved with low patient radiation with:

- a) the intraoral periapical film
- b) the panoramic film
- c) CAT Scan series
- d) complex-motion tomography

## ORIGINAL ARTICLE

## ARTICULATION PAPER AND OTHER OCCLUSAL MARKING DEVICES REVISITED

By Izchak Barzilay, D.D.S., CERT. PROSTHO., M.S.

One of the most commonly used products in the general dental practice is articulation paper. The accuracy of any indicator is important to the creation of occlusal and dental harmony. The uses of articulation paper include:

- assessment and adjustment of existing occlusal contacts,

• occlusal adjustment and stabilization prior to fabrication and insertion of fixed partial dentures, crowns, and removable prostheses,

- adjustment of occlusal and interproximal contacts during the fabrication and insertion of fixed and removable prostheses,

- adjustment of direct restorations

(composite resin and amalgam restorations) immediately post placement,

- recall evaluation of occlusion,
- evaluation of post endodontic occlusal contacts.
- evaluation of occlusion on laboratory casts during the fabrication of dental prostheses.

Occlusal marking devices take up several different forms (Figure 1). Most often they resemble carbon paper in that they are pressure sensitive and transfer ink to objects with which they come into contact. The ideal marking device has the following characteristics:

1. colour transfer and easy to handle under both wet and dry conditions,
2. durable and reusable over multiple applications, and
3. produce accurate and intense markings that are easily identifiable.

Occlusal marking devices may be classified as:

1. articulating paper,
2. articulating ribbon,
3. plastic tape marking devices,
4. occlusal wax, and
5. direct ink application.

### ARTICULATION PAPER

Articulation papers are manufac-



**FIGURE 1.** Select occlusal indicators include: Plastic (Mylar) Tape (Accufilm II (Parkell, Farmingdale NY), Remarq (Dental Ventures of America Inc., Anaheim Hills, CA), articulation papers (Mynol - Thin and XX Thin (Block Drug Corp., Jersey City, NJ), Double Check (Swedish Dental Supplies AB, AKarp, Sweden), Full arch paper (Swissdent, Glendale CA)) and articulation ribbon (Ardent, Broomall PA).

**TABLE 1. THICKNESSES OF SELECT ARTICULATION PAPERS**

TYPE	BRAND	THICKNESS (MICRONS)
XX Thin	Mynol	25
X Thin	Mynol	63
Thin	Mynol	100
Thick	Mynol	350
Premium	Mynol	100
Articulation paper	Bausch	60
Articulation paper – Extra-thin	Bausch	40

Mynol – Block Drug Corp., Jersey City, N.J.

Bausch – Bausch, Cologne, Germany.

tured in different thicknesses colours and configurations. Thicknesses may range from 25 - 350 microns (Table 1). Use of thin articulation paper should result in a more accurate marking (marking of a smaller discrepancy). Thicker paper has the potential to mark not only contacts but also produce false marks. This could result in adjustment of occlusal markings that are not necessary.

Articulation paper is available in a variety of colours (blue, red, green, orange and black). Blue appears to be the most common colour used. Red is useful on highly polished surfaces gold or composite resin. Papers are available with different coloured surfaces so that one arch is marked in red and the opposing arch is marked in blue.

Articulation papers are manufactured in different configurations. The paper may be impregnated with ink through and through so it will produce marks on teeth in both arches or may be inked on only one side so as to produce marks in only one arch. The papers are available in different sizes (strips of different lengths) as well as full arch varieties.

#### ARTICULATION RIBBONS

Articulation ribbons have been used for many years and are either type-writer ribbons (Star Gemini Ribbon Nylon, KO-REC-TYPE, Mississauga, ON) or are manufactured in silk (Ardent Madame Butterfly Silk Tape, Broomall, PA). These devices have a high degree of ink saturation and are therefore reusable many times on the same patient. Distinguishing be-

tween smudges and positive contact is easy in that a positive contact has a dark periphery and pale center because the dye of the ribbon is squeezed to the periphery by the tooth contact. Articulation ribbons are usually saturated with ink so they may be used several times on the same patient before they need to be replaced.

#### PLASTIC TAPE MARKING DEVICES

Early varieties of these marking devices, introduced in the mid 1970s, were coated with ink on one side. The currently used varieties are available with ink coatings on both sides and thicknesses in the 20 - 22 micron range are available. While these products may be accurate, they may be more difficult to handle since they possess static electricity and may be difficult to separate from each other. The product is available in rolls (Pro-Mark Articulation Film, Pascal Co. Inc., Bellevue, WA, Artifol, Bausch, Koln, Germany), precut strips (Accufilm II, Parkell, Farmingdale, NY) as well as adhesive sided to make laboratory procedures easier (Remarq Adhesive Backed Articulation Tape, Dental Ventures of America Inc., Anaheim Hills, CA).

#### WAX

Occlusal waxes are thin sheets of wax (28g-32g) that are applied to the teeth and once occluded, the wax can be evaluated either in the mouth or removed from the mouth for inspection. This method gives a three dimensional representation of the occlusion and perforation indi-

cates positive contact. Direct marks are not however left on the tooth structure and adjustment must be made by relating the perforations to their tooth locations.

#### PAINT LACQUER

Although not used commonly, a paint lacquer may be applied to the teeth under a dry field prior to tapping the teeth together.<sup>1,2</sup> This method is time consuming and may be messy.<sup>3</sup>

Considering the fact that this is a very commonly used product that ensures the final occlusal fit of a prosthesis and therefore determines its function and effectiveness, it is surprising that little has been published in the scientific literature on the accuracy of these materials. Millstein<sup>4</sup> evaluated six occlusal marking indicators using scientific means and found a wide range of variability between different indicators used for the same purpose. Little else has been published on evaluation of these materials.



**FIGURE 2.** Silicone bite registration (Blue Mousse, Parkell, Farmingdale NY) of the right mandibular first molar to the right mandibular cuspid indicating occlusal contacts in the areas of registration perforation.



### CLINICAL PROCEDURE

When evaluating and adjusting occlusion in the centric relation jaw position the patient should be reclining in the dental chair. Adjustments in the centric occlusion position should be done with the patient in a more upright position. The articulation paper should be sized to an adequate length to cover the teeth that are to be marked. Strips should be mounted in articulating forceps and the teeth dried if possible to ensure accurate markings. Markings should be made using different colours for centric positions and excursive positions. Adjustments should be made as needed being careful not to overadjust and affect vertical dimension and jaw support. Articulation paper should be changed regularly to ensure accurate contacts and ultimate occlusion verified with the use of shimstock articulation film (Ardent Shimstock Occlusion Foil – 8 microns, Broomall, PA).

When using occlusal indicators, difficulties may arise when marking wet or highly polished or glazed surfaces. Care must be taken in reading marking from thick papers. Highly inked markers may produce false readings and if overused, ink will be exhausted and the indicator must be changed often to ensure an accurate marking.

### CLINICAL COMPARISON OF DIFFERENT INDICATORS

In an attempt to illustrate different indicators in a clinical situation (based on Millstein<sup>4</sup>), a polyvinyl siloxane bite registration was made of teeth in the mandibular right region (Figure 2). This registration shows definitive occlusal contact on the distal marginal ridge of the second premolar and two contact points on the buccal cusp of the first premolar. Contact is almost present on the buccal cusp of the second premolar. Different occlusal marking devices were used to show their marking potential. XX Thin Mynol (25 microns) shows these occlusal points well — Figure 3) as does Accufilm II (Figure 4). Thicker media start to pick



FIGURE 3. Occlusal marking using XX Thin Mynol (25 microns) showing accurate marking of occlusal contact.

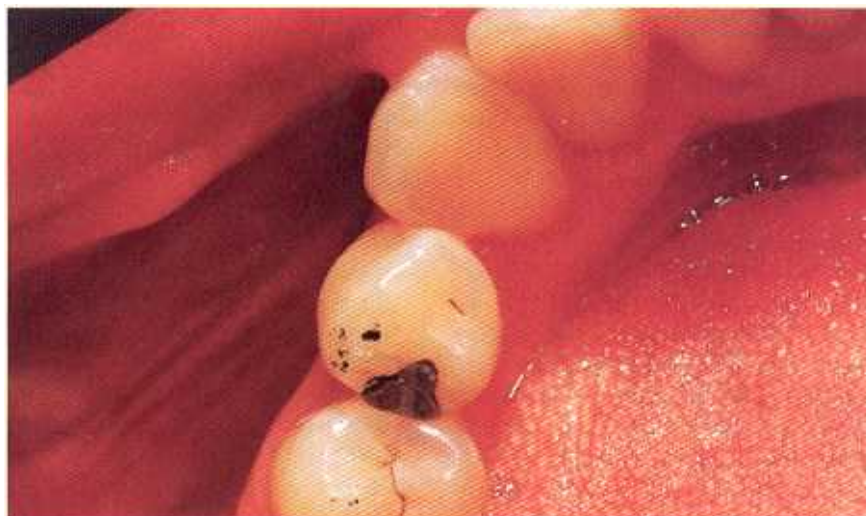
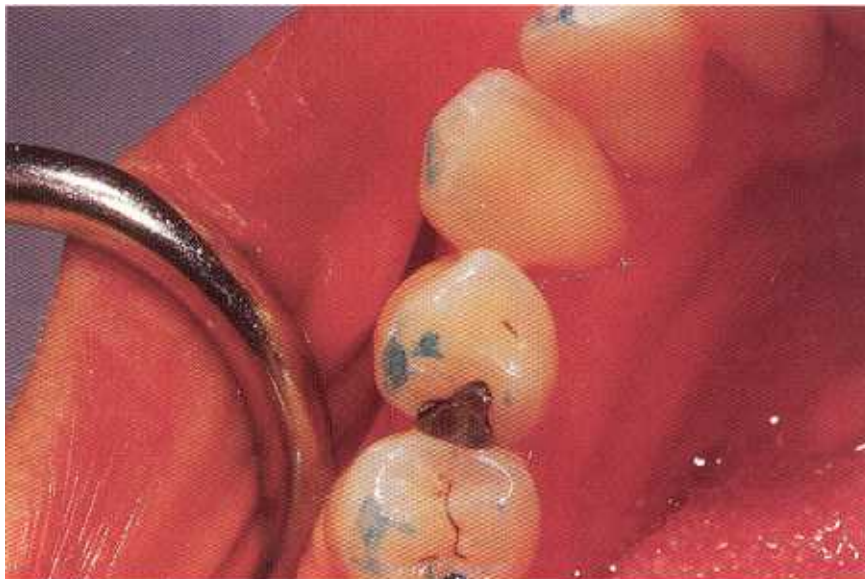


FIGURE 4. Occlusal marking using Accufilm II (21 microns) showing accurate marking of occlusal contact.



FIGURE 5. Centrimatic Articulation Paper (Swissdent, Glendale, CA) indicates a greater number of occlusal contacts than is present in the silicone registration.



**FIGURE 6.** Thick Mynol (350 microns) shows a large number of occlusal markings (false markings are evident).

up additional markings (Figures 5 and 6). Adjustment of these false markings lead to needless reduction of tooth structure.

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#### REFERENCES

1. Troest T. Diagnosing minute deflective occlusal contacts. *J Prosthet Dent* 14: 71, 1964.
2. Chaiken RW. An occlusal indicator in continuous use and trial for 15 years. *Quintessence Int.* 7(2) 53-61, 1976.
3. Occlusion Ramfjord and Ash 1971 W.B. Saunders Company Toronto.

4. Millstein PL. An evaluation of occlusal contact marking indicators: A descriptive, qualitative method. *Quintessence Int* 8(2);813-818, 1983.

CONTINUING DENTAL EDUCATION



Mynol is a Mylar (plastic) based articulating paper.

a) True b) False

2. Heavily saturated papers can be used "over and over."  
a) True b) False
3. The thinnest marking devices produce the most accurate results.  
a) True b) False
4. Occlusal marking should be done in both reclined and upright positions to cover CR and CO.  
a) True b) False
5. Different coloured marking devices are only useful to differentiate between centric, lateral and protrusive occlusal markings.  
a) True b) False

## ANTISEPTICS AND DISINFECTANTS

By Louis P. Gangarosa, Sr., PhD, DDS;  
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One of the most important requirements of a dental practice is protection of the patient and operators from spread of infection. This requires proper use of sterilizing procedures (which kill all forms of life) as well as disinfection, asepsis, antisepsis, cleanliness and hygienic care of skin. Whenever possible, autoclaving is the preferred method, since steam heat under pressure at high temperatures is the best

method of killing microbes. Sterilization is an absolute requirement for any instrument that will enter human tissues. The subject of sterilization is not covered in detail in this review. These details can be found in textbooks of microbiology and in handbooks of operating procedures.

Although autoclaving is preferred it is not always possible, so there is still a need for other methods of controlling microbial growth. Chem-

ical antiseptics and disinfectants are, therefore, important, as are the proper use of asepsis, cleanliness, and hand cleaning. Here, we will review chemical antiseptics and disinfectants and attempt to define their usefulness in dental practice.

#### A. DEFINITIONS

**Antiseptic.** A substance which, when used on living tissue, kills or

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