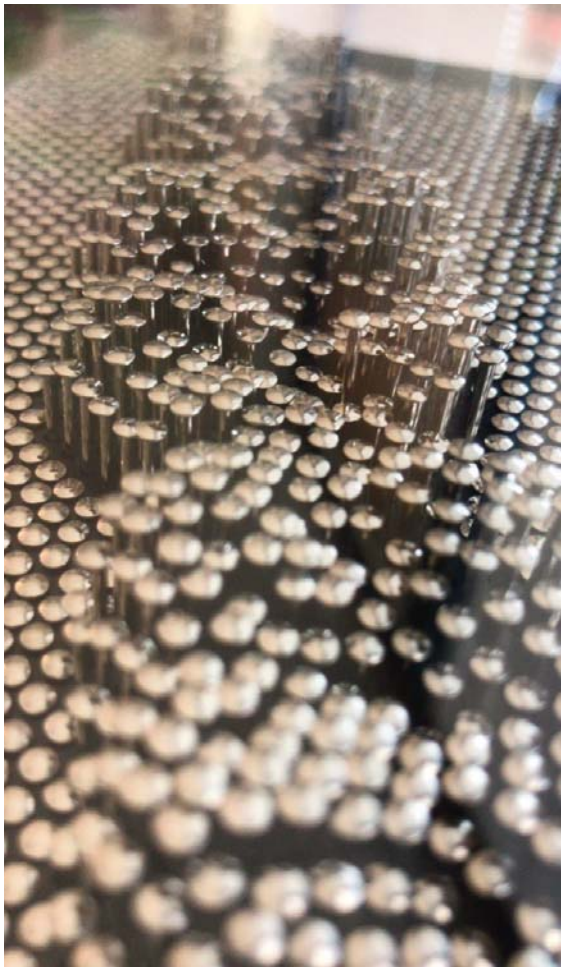
OccluSense®
by Bausch

Guide for digital occlusion

Interpretation of the OccluSense® data



INTRODUCTION

Since the beginning of dentistry, the occlusal adjustment is one of the most discussed topics.

Classic articulating papers or foils mark the occlusal contacts in intercuspation. However, the temporal recording of occlusal contacts during dynamic jaw movements or the detailed masticatory pressure distribution are left unrecorded.

OccluSense® allows to visualize and record the entire temporal jaw movement sequence up to the final intercuspation including the relative masticatory pressure distribution of the jaw.

The interpretation of the occlusal pressure, recorded by OccluSense®, is different from classical occlusion test materials as much more information is being provided. This information includes the recording of the occlusal contacts during the slide of the mandible from the initial contact to the maximal intercuspal position.

OccluSense® by Bausch now enables every dentist to record these occlusal situations and evaluate them step by step.

This guide will illustrate how to interpret the OccluSense® recordings properly, in order to create the most accurate occlusion for each patient individually.

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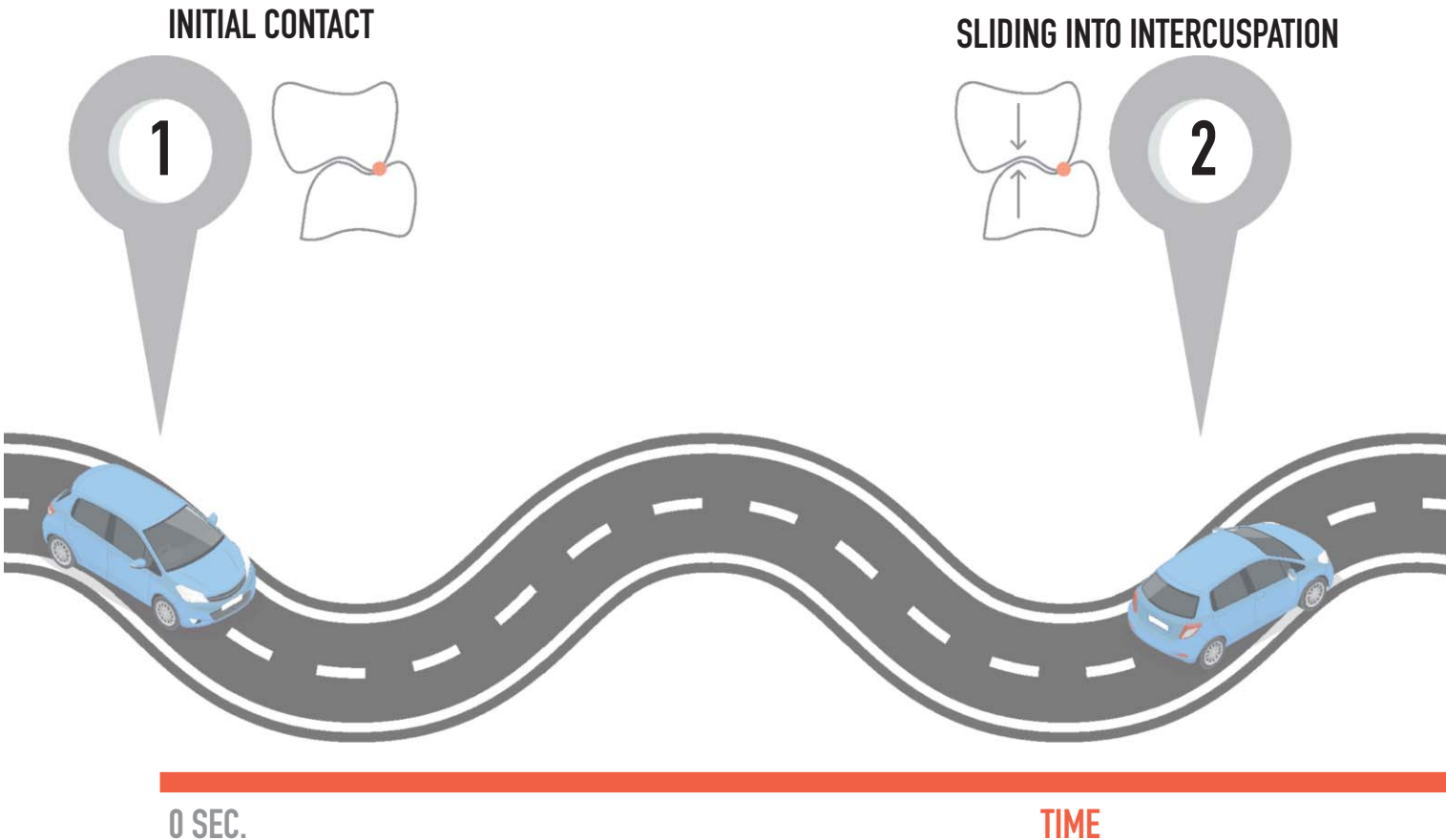
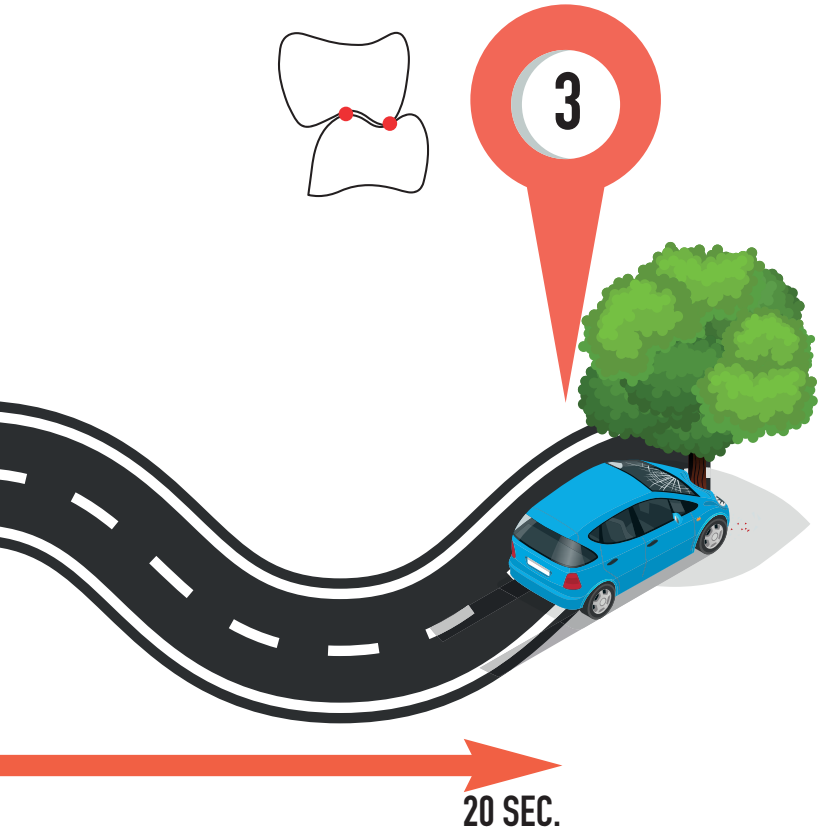
OCCLUSION IN MOTION

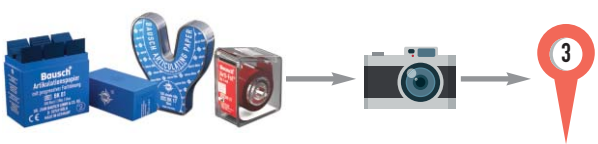


MAXIMUM INTERCUSPAL POSITION

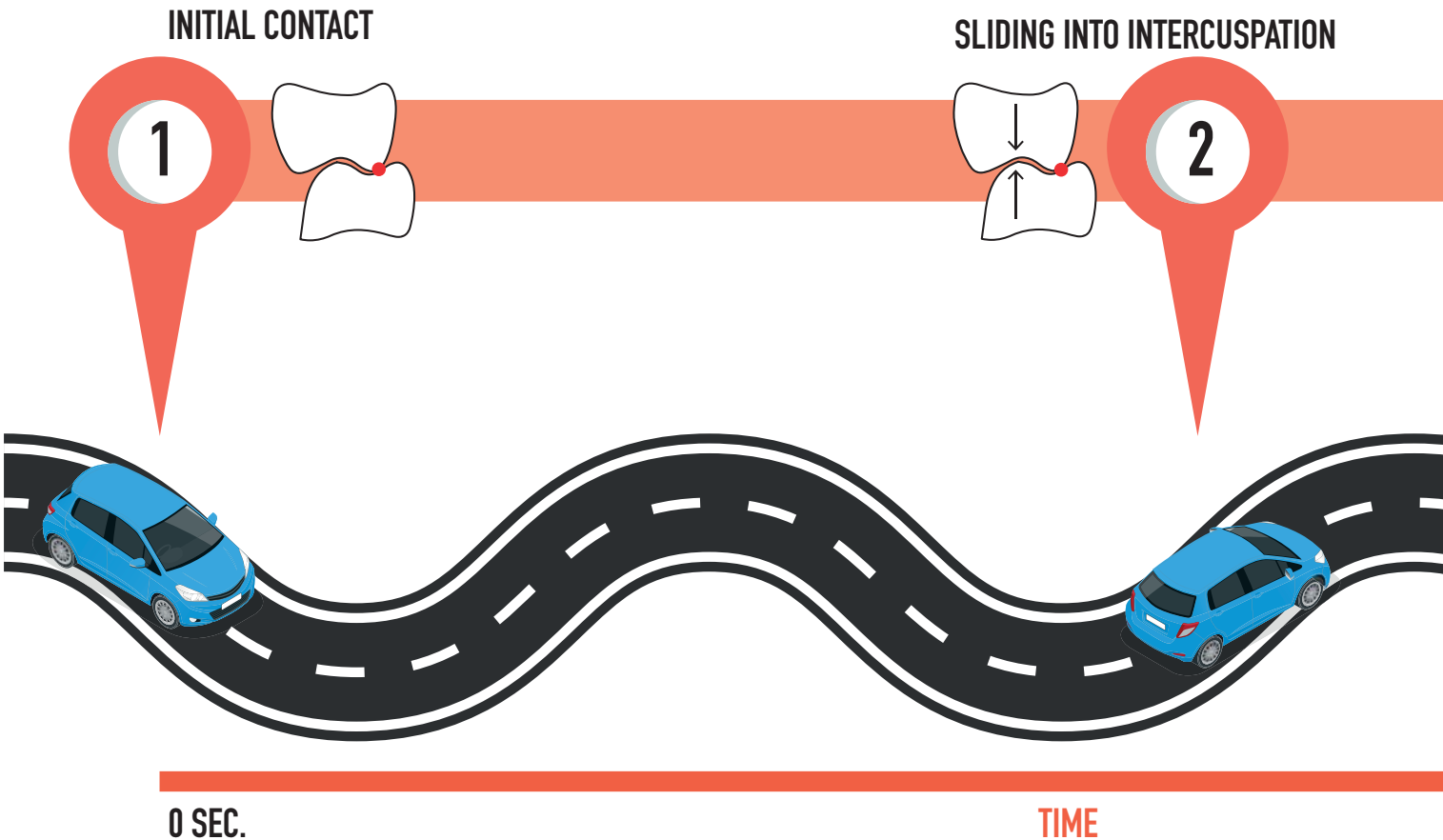


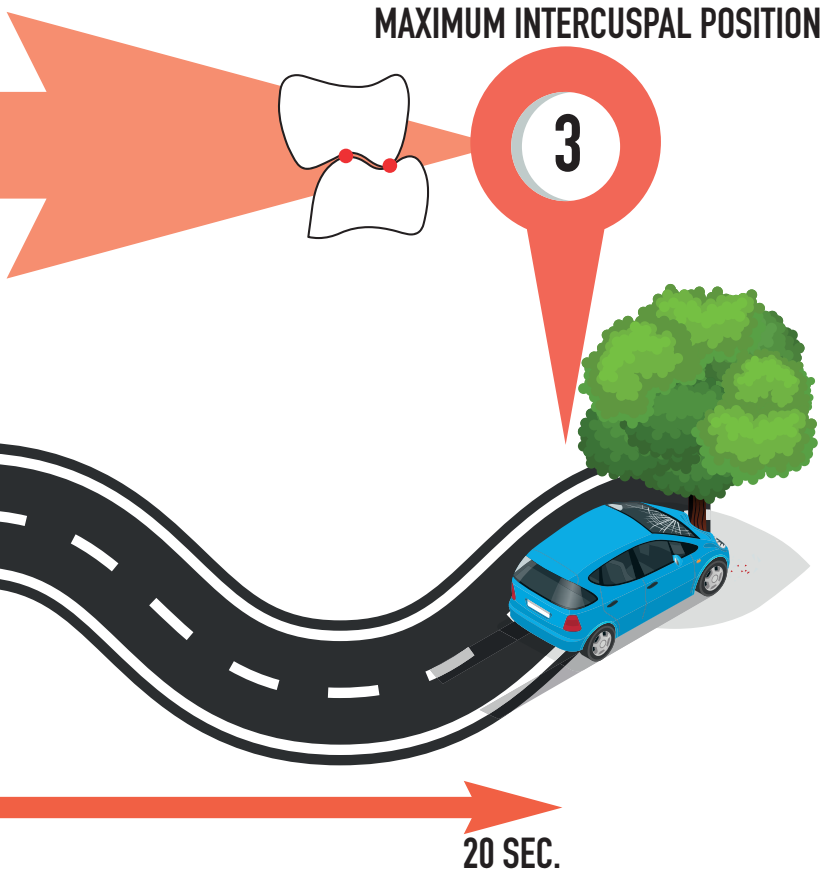
Although occlusion is a process in motion over time, checking the occlusal situation with articulating papers or occlusion test foils is always a snapshot of the final intercuspidal position.

Even though classic occlusion test material such as articulating paper or foil mark every occlusal contact, it can not be determined when these contacts have occurred in time. Thus, the occlusal contacts during the temporal mandible movement and the detailed masticatory pressure distribution of the jaw cannot be represented.



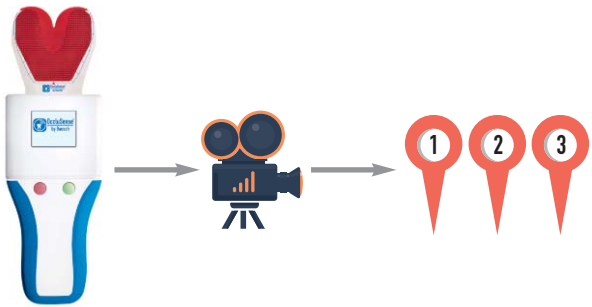
OCCLUSION IN MOTION





OccluSense® allows to visualize the entire temporal jaw movement sequence.

OccluSense® records the occlusal contacts during the slide of the mandible from the initial contact to the maximal intercuspal position over the entire course of time.

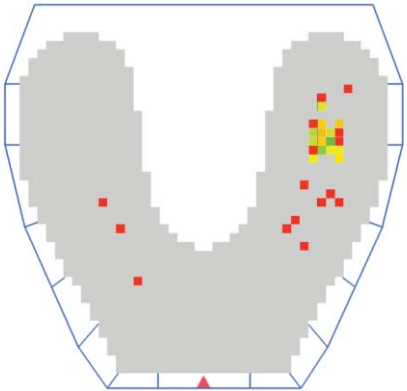


TECHNOLOGY

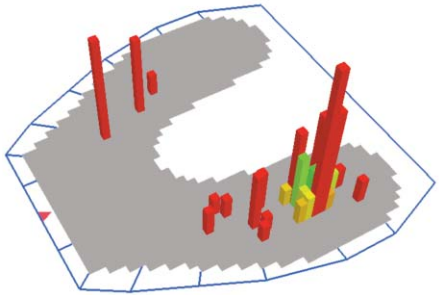
THE OCCLUSENSE® SENSOR

The OccluSense® sensor is a 60µm thin color coated foil with a printed circuit containing 1018 pressure sensitive pixels which are able to capture 256 levels of pressure. The thin and flexible sensor is able to record occlusal contacts with a low pressure as well as occlusal contacts during dynamic movements of the jaw.

As the sensor is color coated, the exact contact points will be marked on the patient's teeth. OccluSense® is being used like a traditional articulating paper or occlusion test foil but enables the dentist to evaluate the masticatory pressure from the first contact to the maximum intercuspation.



The colors show the change in masticatory pressure of the occlusal contact points in relation to each other and thus visualize the nature of each contact point.



The height of the columns visualizes the relative masticatory pressure between all contact points of the full arch.

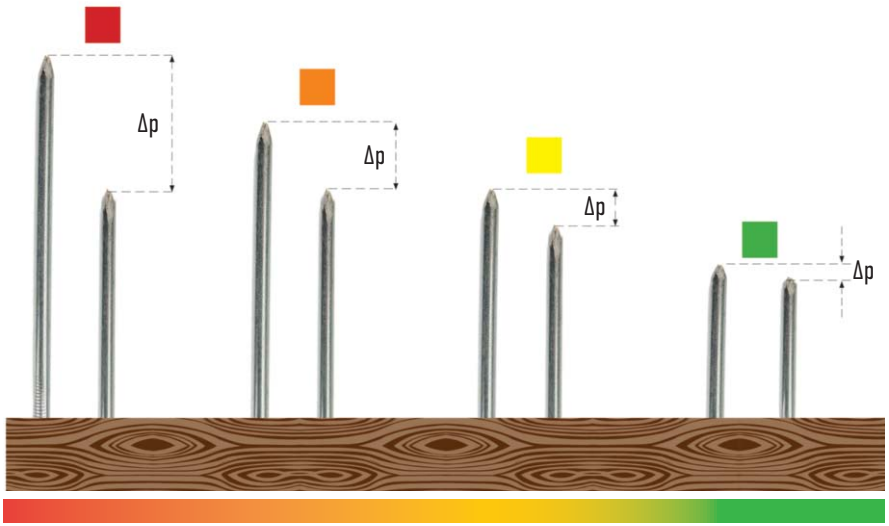
MEANING OF COLORS

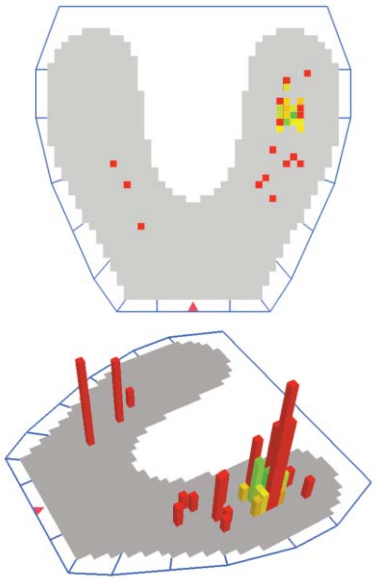
HOW THE OCCLUSENSE® WORKS

The OccluSense® recording displays the occlusal situation of the full jaw in different colors. In the 3D view, columns in different heights and colors are shown additionally. The colors are calculated by the relative pressure between the contact points while the height of the columns only shows the masticatory pressure.

The **maximum pressure change (Δp)** between contact points is **red**, the **minumum pressure change (Δp)** between contact points is **green**. The other colors symbolize the values within this range.

Δp (Delta p) denotes the change (Δ) in pressure (p).





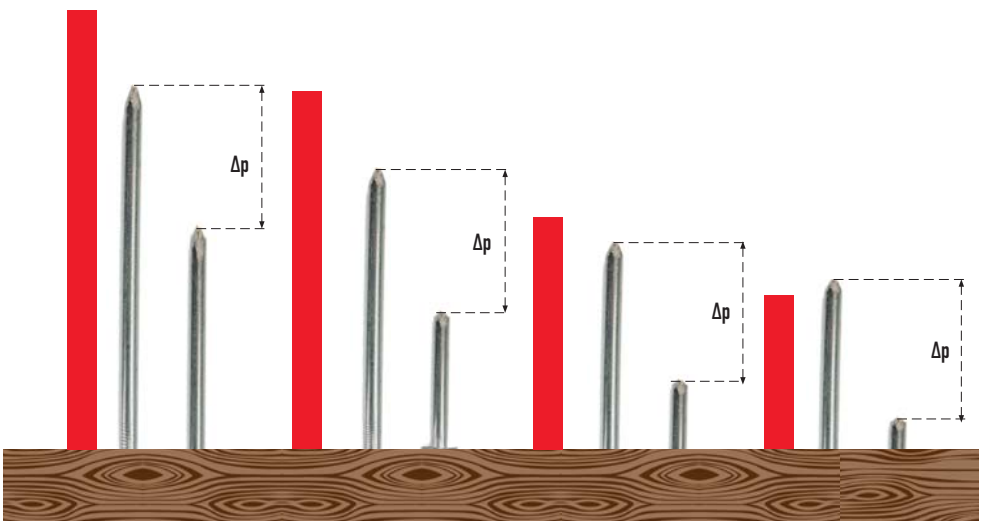
MEANING OF COLORS

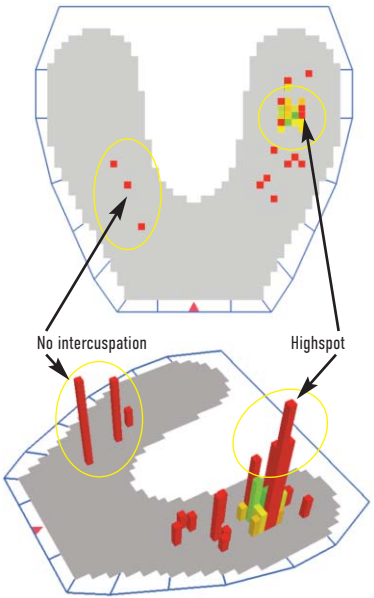
DOES "RED" IMPLY ALERT?

The red color does **not** imply alert. These contact points just show a large pressure change (Δp) between one contact point and its adjacent contact points.

Standalone red points or columns are typical for:

- highspots
- initial occlusal contacts
- occlusal contacts which are not in intercuspation
- occlusal contacts recorded during dynamic movements



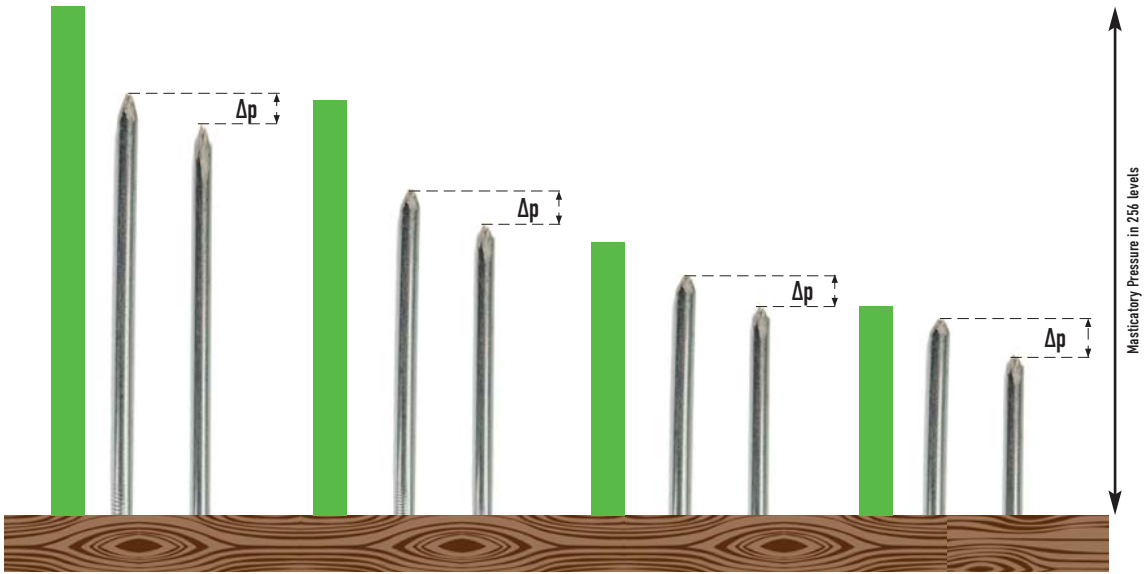


GREEN CONTACT POINTS

Green contact points show a small pressure change (Δp) between one contact point and its adjacent contact points.

This is typical for:

- planar contact points
- occlusal contacts on abrasive teeth
- areas of multiple occlusal contact points with similar characteristics



As the change in pressure (Δp) between the contact points is about the same in all of these examples, the color is always green.

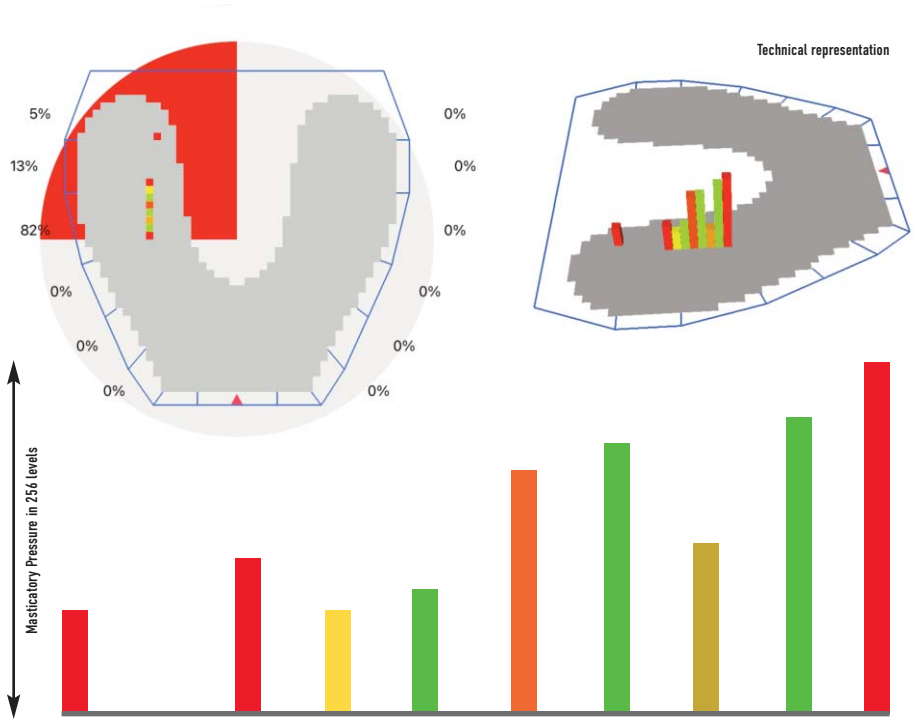
The height of the columns visualizes the pressure.

MEANING OF COLUMNS

3-DIMENSIONAL VISUALIZATION OF PRESSURE

The height of the columns visualizes the relative masticatory pressure between all contact points of the full arch.

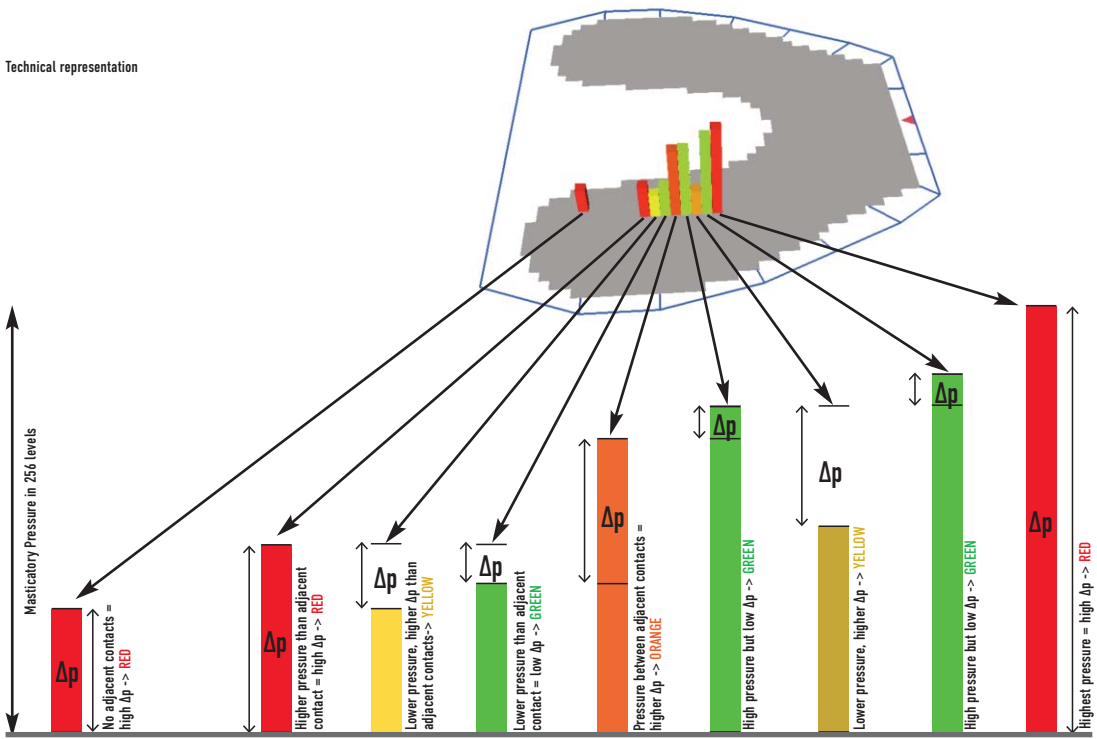
The visualization of the relative masticatory pressure does not depend on the colors!



MEANING OF COLUMNS

PRESSURE CHANGE (Δp) VISUALIZED BY COLORS

The colors are defined by the pressure change (Δp) between one contact and all adjacent contacts.

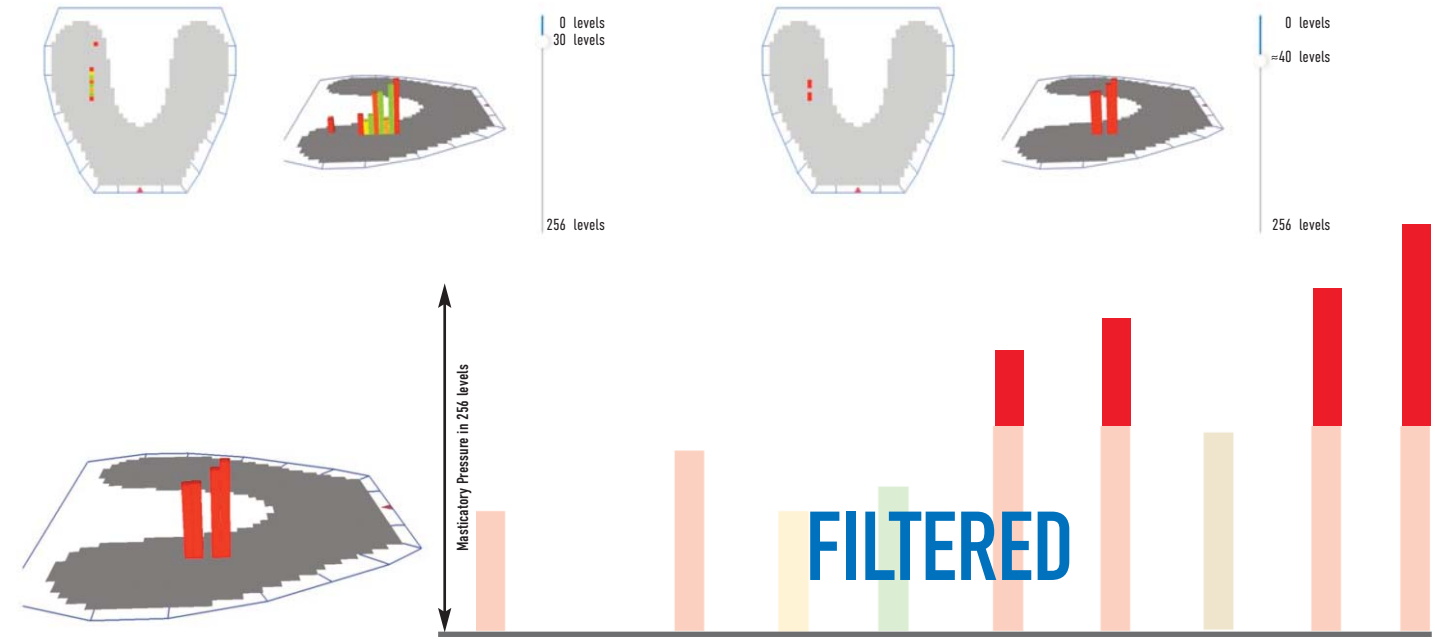


ADDITIONAL CONTROLS

FILTERING

The masticatory pressure is being captured in a range between 0 and 256 levels. Every recording stored in the OccluSense®-iPad-App shows a slider for adjusting the pressure level. During the playback of the recordings, this slider can be used to eliminate “unwanted” information for a precise evaluation of the contact points. At the same time, **the color information will be recalculated** by taking the remaining contact points into consideration. To avoid the data being altered by electrical noise of the sensor, a threshold is set to a default value of "30 pressure levels".

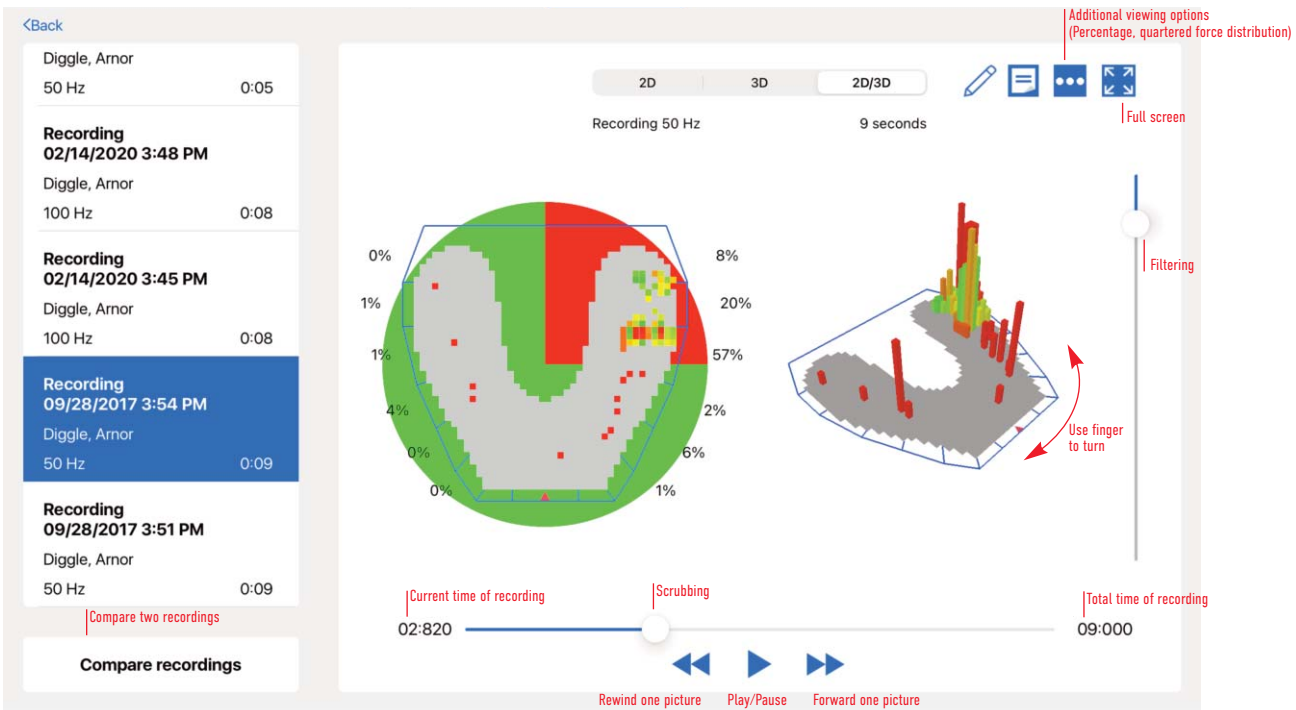
Technical representation



ADDITIONAL CONTROLS

MOTION CONTROLS

Even though occlusion is a movement, articulating papers and foils show a static snapshot. When checking the dynamic occlusion, laterally or protrusive, the markings of articulating papers and occlusion test foils always show the final step of the occlusal movement. With OccluSense®, the motion of the occlusion is being captured from the first contact to the final intercuspation. The occlusal movements are being recorded like a movie, they can be stopped, rewound, forwarded and filtered. Additional viewing options show the percentage of the relative pressure or a quartered pressure force distribution.



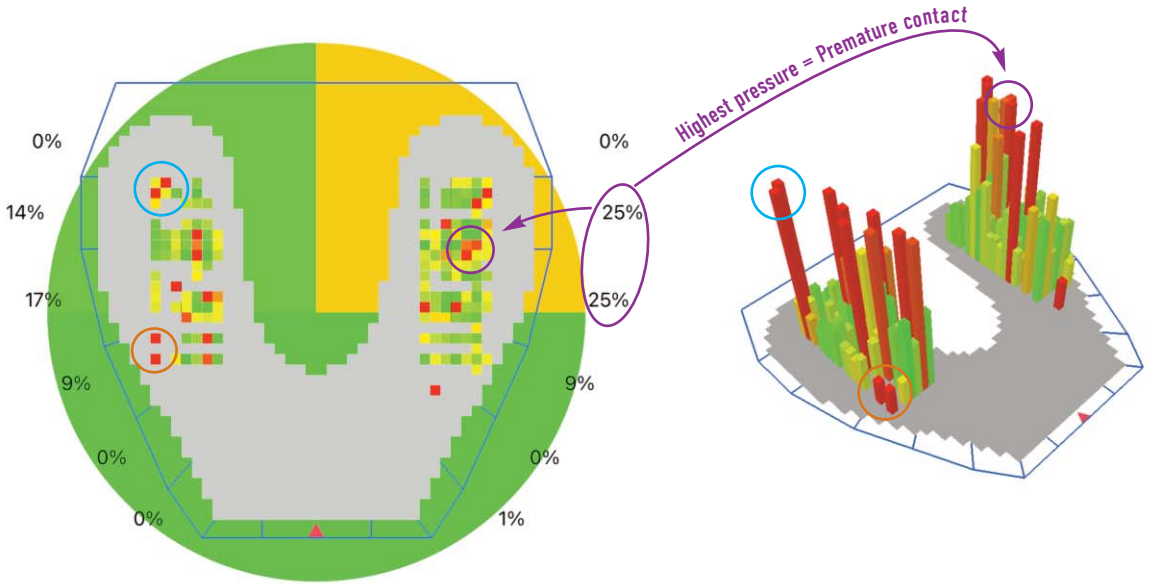
OCCLUSAL SITUATIONS

STATIC OCCLUSION

Maximum intercuspation

- Regular occlusion on the molar
- Regular occlusion on the premolar
- Premature contact

Occlusion Test Material:
Bausch Articulating Paper with progressive color transfer BK 01 - 200 microns



Regular occlusion on the molar
Contacts with high pressure = high columns higher pressure than adjacent contacts = high Δp -> RED

Regular occlusion on the premolar
Contacts with low pressure = low columns no adjacent contacts = high Δp -> RED

Premature contact
Contacts with high pressure = high columns, similar Δp between adjacent contacts -> RED and ORANGE

OCCLUSAL SITUATIONS

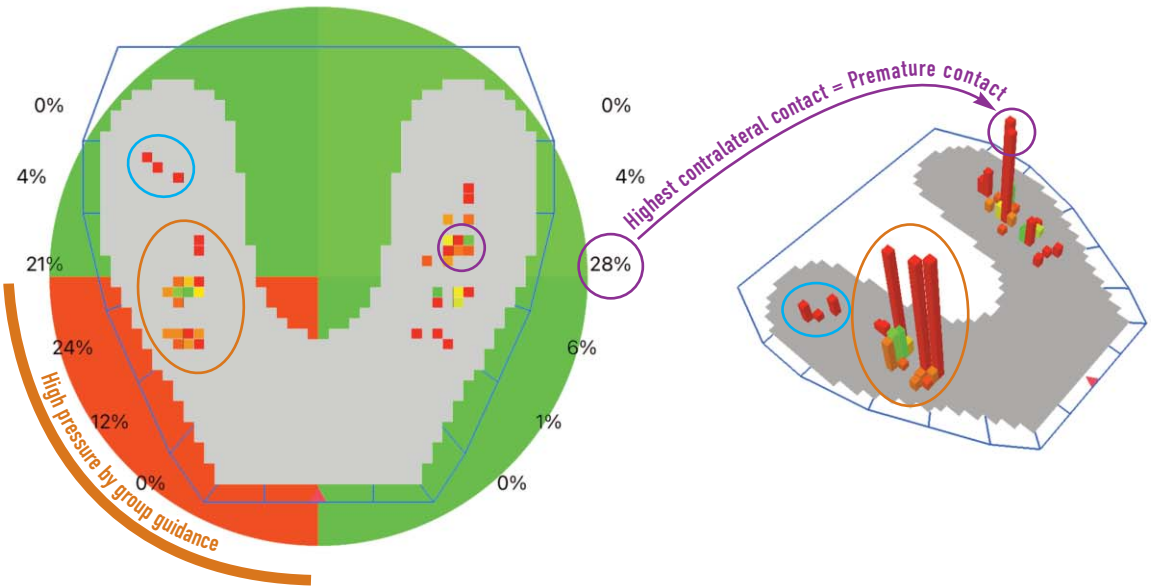
DYNAMIC OCCLUSION – LATEROTRUSION

Laterotrusion right

- Regular occlusion on the molar
- Group guidance
- Premature contact

Occlusion Test Material:
Bausch Progress 100 with progressive color transfer BK 51 - 100 microns blue

Occlusion Test Material:
Bausch OccluSense® Pressure Sensor BK 5025 - 60 microns red



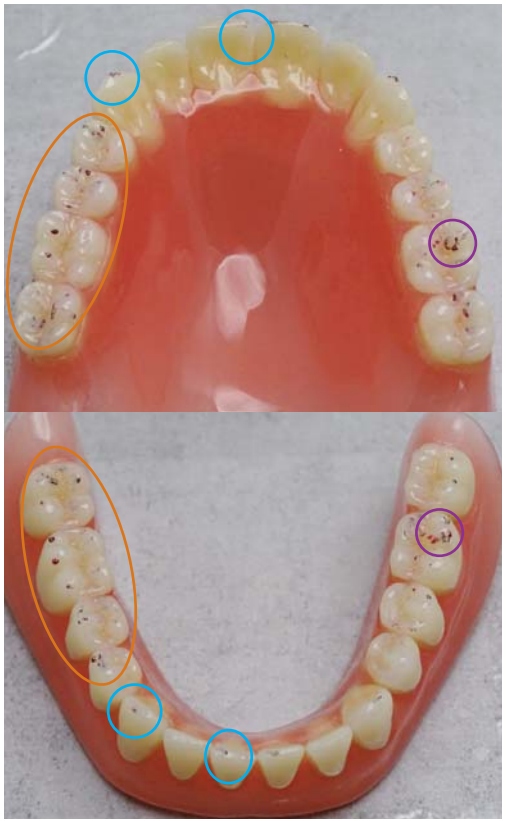
Regular occlusion on the molar
Laterotrusion with low pressure = low columns, higher pressure than adjacent contacts = high Δp -> RED

Group guidance
Group Guidance with high pressure = high columns, higher pressure than adjacent contacts = high Δp -> RED
Group Guidance with lower pressure = lower columns caused by movement = RED, ORANGE, GREEN

Premature contact
Contacts with high pressure = high columns, similar Δp between adjacent contacts -> RED and ORANGE

OCCLUSAL SITUATIONS

DYNAMIC OCCLUSION – PROTRUSION



Protrusion

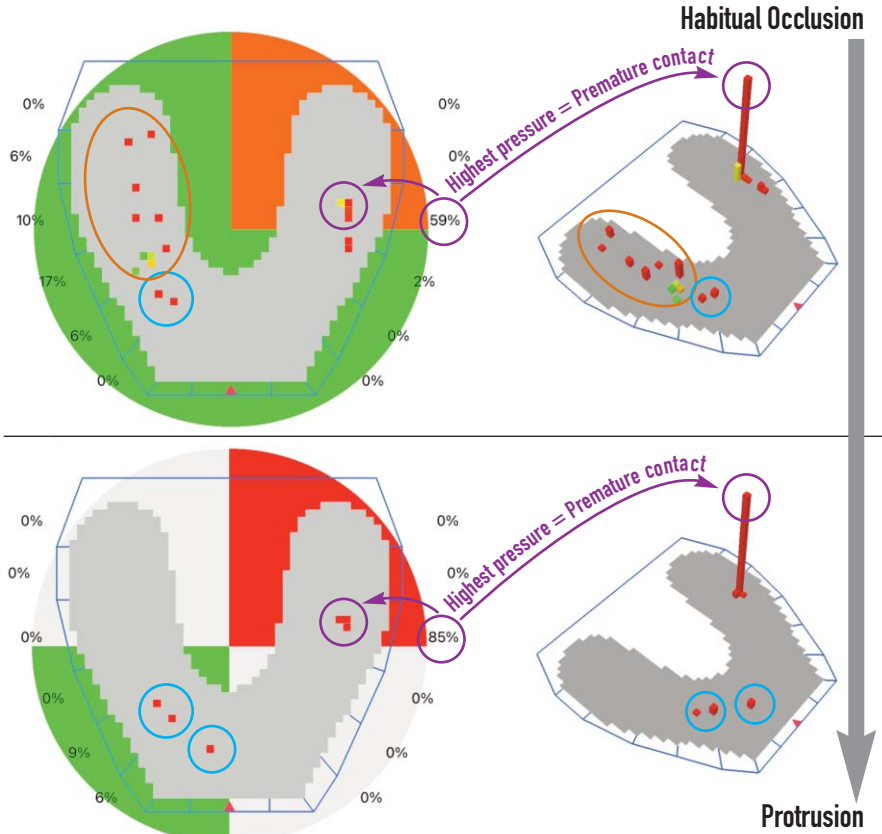
- Anterior canine guidance
- Habitual occlusion -> protrusion
- Premature contact

Occlusion Test Material:
Bausch Arti-Fol Articulating-Foil
two-sided BK 24 - 8 microns black

Occlusion Test Material:
Bausch OccluSense® Pressure Sensor
BK 5025 - 60 microns red

OCCLUSAL SITUATIONS

DYNAMIC OCCLUSION – PROTRUSION

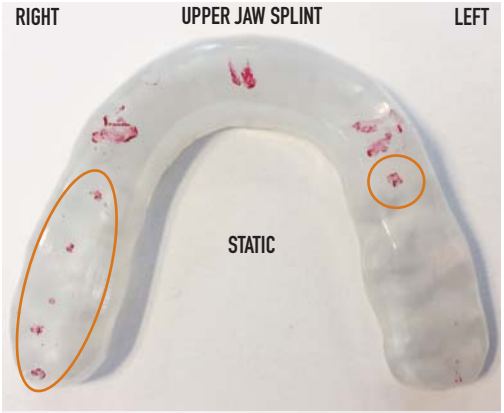


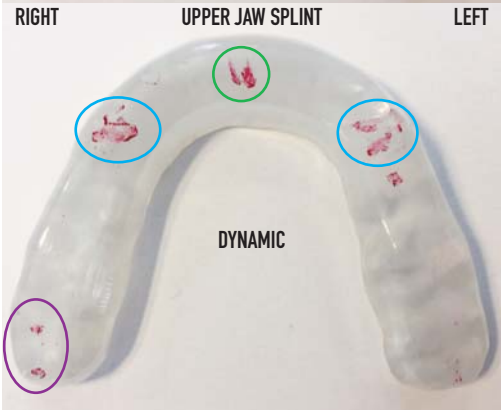
- **Anterior canine guidance**
  Contacts with low pressure = low columns
  no adjacent contacts = high Δp -> RED
- **Habitual occlusion -> protrusion**
  Contacts with low pressure = low columns
  no adjacent contacts = high Δp -> RED
  Contact points with lower pressure =
  similar Δp between adjacent contacts ->
  ORANGE, YELLOW, GREEN
- **Premature contact**
  Contact with high pressure =
  high column, high Δp -> RED

- **Anterior canine guidance**
  Contacts with low pressure = low columns
  no adjacent contacts = high Δp -> RED
- **Premature contact**
  Contact with high pressure =
  high column, high Δp -> RED

OCCLUSAL SITUATIONS

SPLINT THERAPY



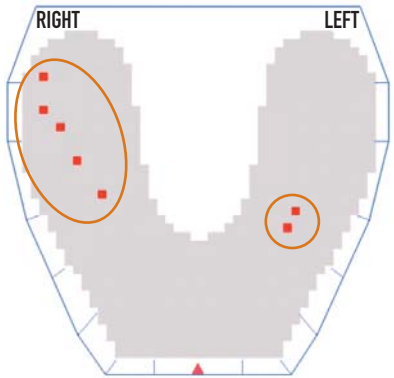


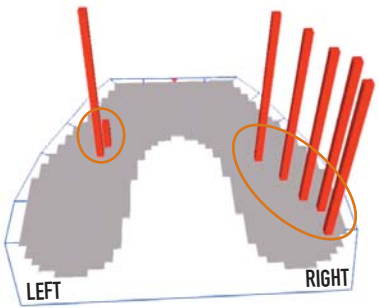
Adjustment of splints

- Static contacts
- Protrusion movement/Premature contact
- Laterotrusion movement
- Protrusion movement

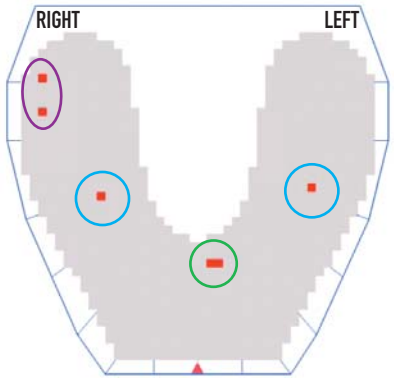
Occlusion Test Material:
Bausch OccluSense® Pressure Sensor
BK 5025 - 60 microns red

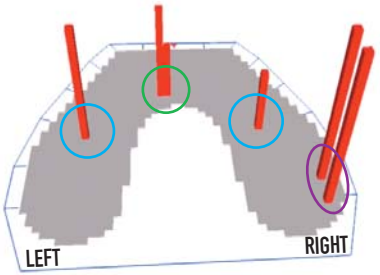
Static Occlusion





Static contacts
Contacts with high pressure = high columns
(one contact with low pressure = low column)
no adjacent contacts = high Δp -> RED





Dynamic Occlusion (Protrusion)

Protrusion movement/Premature contact
Contacts with high pressure = high columns
no adjacent contacts = high Δp -> RED

Laterotrusion movement
Contacts with lower pressure = lower columns
no adjacent contacts = high Δp -> RED

Protrusion movement
Contacts with lower pressure = lower columns
no adjacent contacts = high Δp -> RED

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