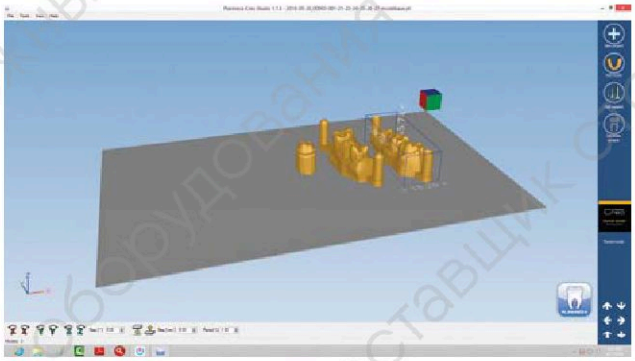
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Planmeca Creo™

print job design

quick guide

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Planmeca Creo print job design quick guide

This quick guide describes how to design the print job to obtain optimum printing results. The examples presented in this quick guide are to help understand the basic principles of support placement and model positioning in Planmeca Creo Studio software.

1 SUPPORT PLACEMENT

A build plate in various situations is illustrated below.

The pictures are defined by

- virtual layers (horizontal lines) that are cured (in green)

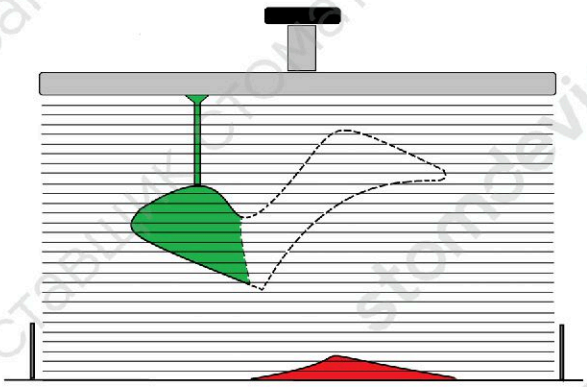
  and

- failed prints (dotted line) and failed prints resulting in material cured to the basin glass (in red).

NOTE

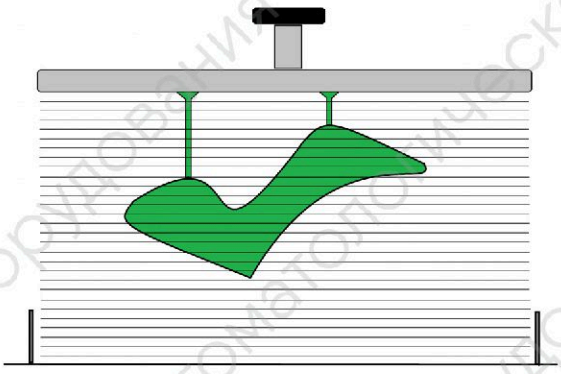
Planmeca Dental model material may require more supporting than Surgical guide material due to material properties.

1.1 Critical support positions



The most critical areas to support on a print model are the areas where initial contact is made relative to the build plate.

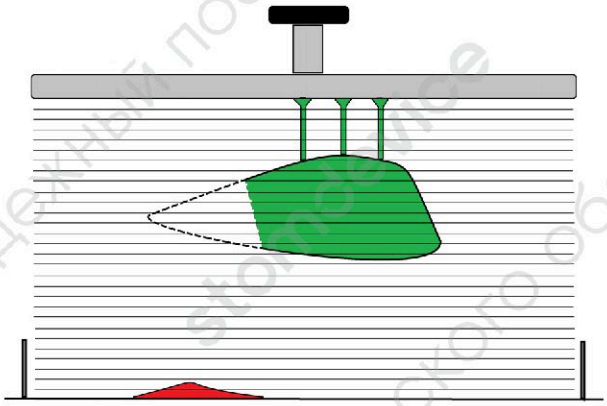
In this example as the other critical support is removed there is no direct contact route to the build plate and no material can be cured onto the build plate. When the higher critical point is not connected to the build plate the model cannot continue to grow. Thus half of the print starts to fail and the failed part of the print is cured onto the basin glass.



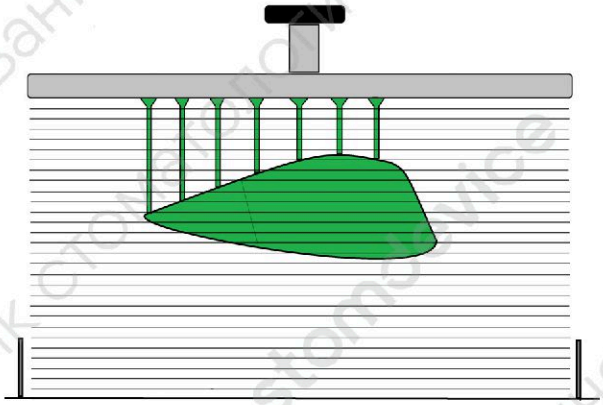
In this picture both critical points are supported and therefore the print is successful. The green (cured material) starts growing from the two supports and continues to grow until the print is complete.

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1.2 Placement with sloped surfaces



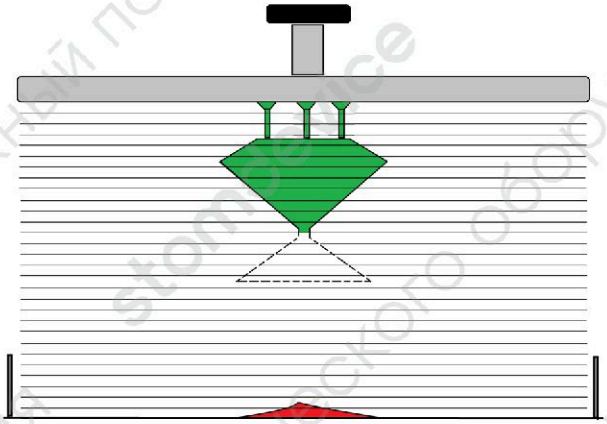
The need for additional supports increases when a print creates an angle less than 25 degrees to the build plate. If the slope is very low the part creates torsion and internal forces in the print. This significantly increases the possibility for failed prints.



By adding supports also sloped surfaces can be printed successfully.

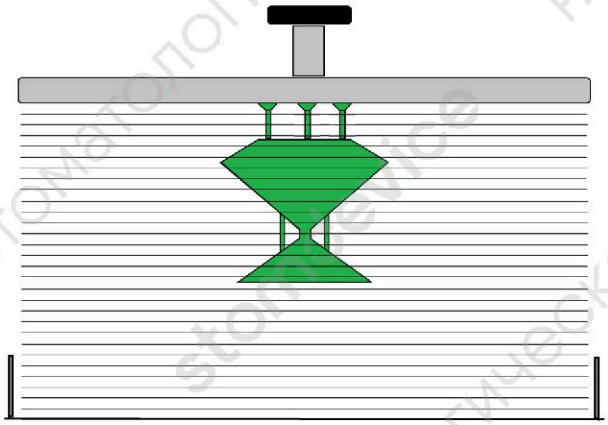
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1.3 Placement with large deviations in cross section area



A print should preferably be placed so that it grows from a larger cross section to the smaller.

If the print is placed as illustrated it will fail due to extreme changes in cross section area. The print fails in its weakest point in the middle of the print.



To avoid print fail in cross section area:

- Rotate the print in other position

  or

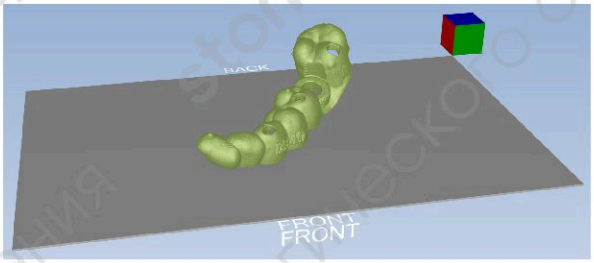
- Add supports to make the print stronger.

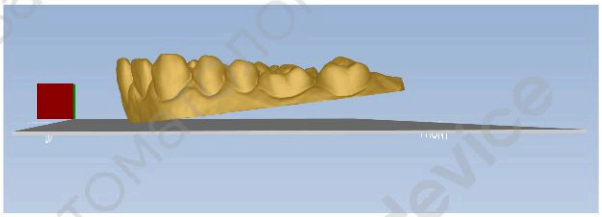
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2 MODEL POSITIONING

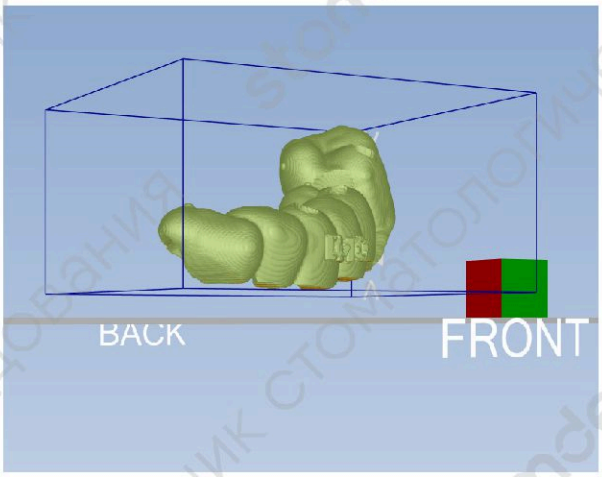
Positioning of the model can greatly impact the printing time and success. It can be nearly impossible to support a print in one position, and easy in another. With smart positioning also geometrically significant areas can be protected.

Generally the initial position of the imported model needs to be adjusted.





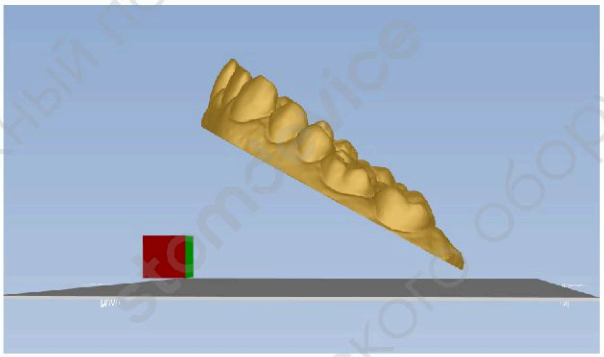
In these examples the surgical guide and dental model are in the initial import position, not optimal for printing.



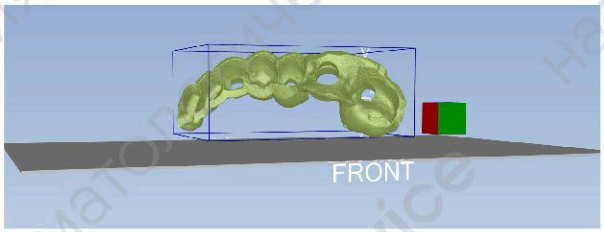
The imported model is positioned in contact with the build plate. To ensure more stable print lift the model 3-5mm from the build plate.

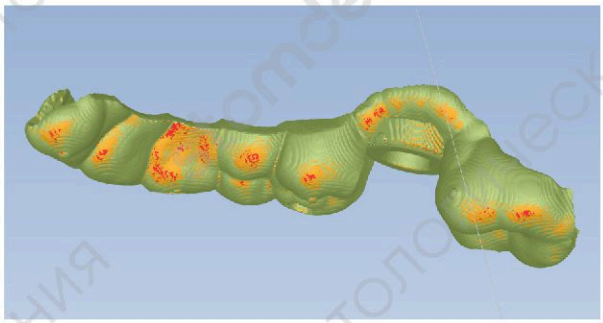
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2.1 Achieving optimal position



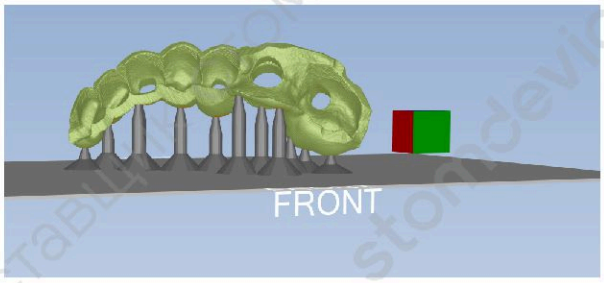
In these examples the models are lifted 3 mm and rotated to optimal positions so that anatomical surfaces are facing away from the build plate. In this position supports are not needed on any important surfaces.



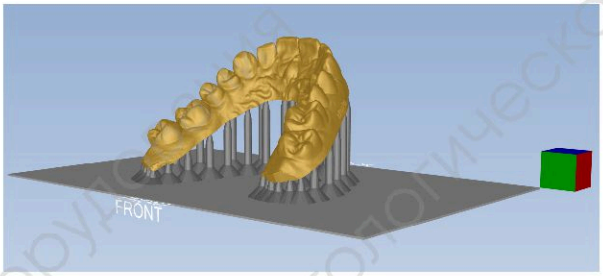


The colours indicate areas where support placement is suggested.

Red colour indicates a high probability for support placement need, the orange colour a moderate need. The colour scale is indicative and should only be used as an aid in the support placement process.



Here the guide model is supported in final optimal position.

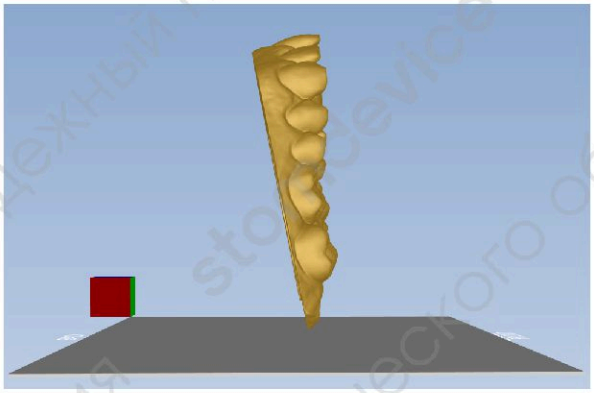


In this example the dental model is optimally supported and lifted 3mm from the build plate in a 45 degree angle.

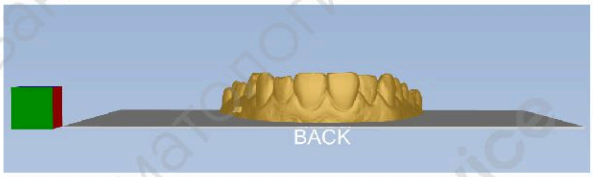
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2.1.1 Other positioning examples

Depending on the printing goals the dental models can be placed in other positions as well.



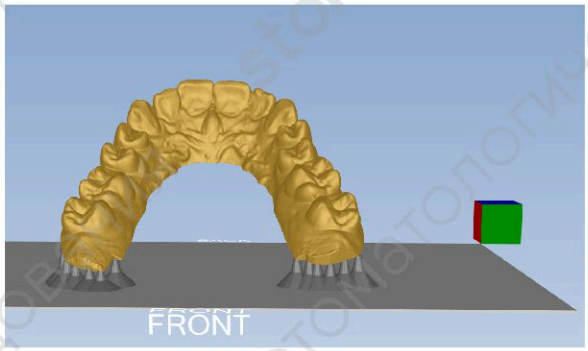
In this example the model is placed in vertical position. This position minimizes the area occupied on the build plate but results in a longer printing time.



Here the model is placed in the lowest position to save printing time. In the lowest position the supports are not necessarily needed.

NOTE

Use this position with caution as the models tend to grow tensions and become slightly bent when printed in direct contact with the build plate. The larger the model the more significant the phenomenon. It is therefore recommended to lift the model and support.

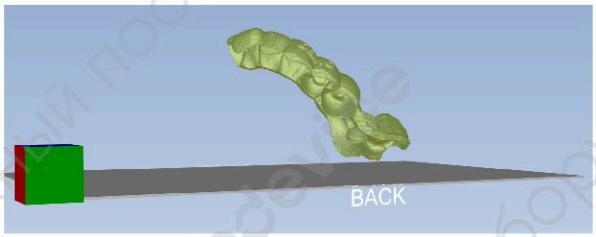


This example illustrates the most important supports for when model is placed at an angle.

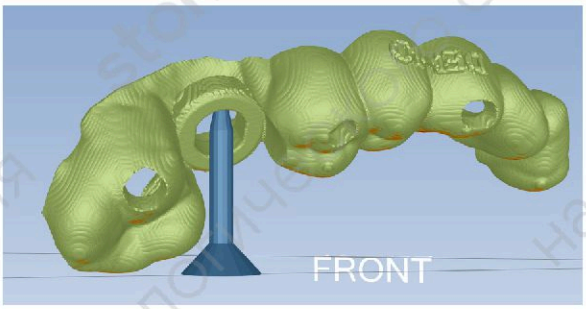
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2.1.2 Poor positioning examples



In this example the model is set unnecessarily high and anatomical surfaces are facing the build plate.



Here the model is positioned so that the geometrically sensitive sleeve hole has to be supported. This should be avoided to withhold the integrity of the sleeve hole geometry.



In this example the anatomical surfaces are compromised due to poor positioning and support placement.

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