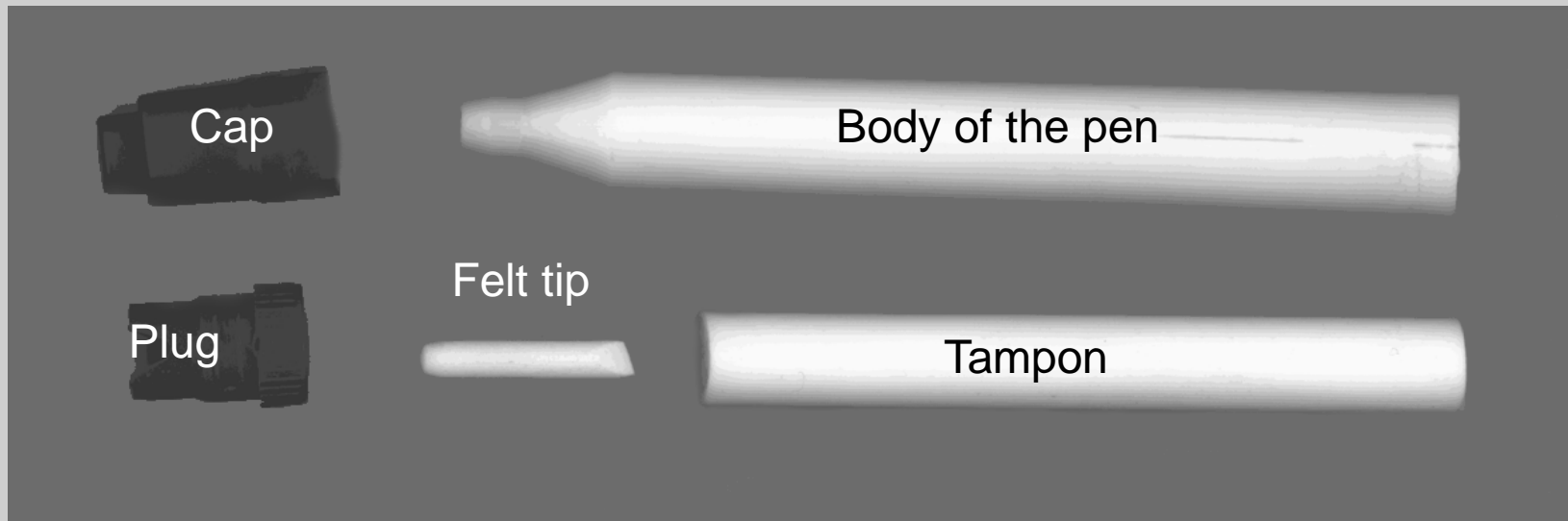


Sniffin' Sticks

Instructions

Sniffin' Sticks - Instructions

Sniffin' Sticks are felt-tip pens filled with an odorant. Removal of the cap will release the odor.



Sniffin' Sticks - Instructions

The longer the cap is removed, the more odor is released.

This leads to

- adaptation of the patient to the odor
- olfactory contamination of the environment
- shorter decreased overall usability of the pen over time

Thus, the cap of the pen should only be taken off to present the odor. It should be put back immediately after presentation of the odor.

Sniffin' Sticks - Instructions

The pen is held approximately **2 cm** in front of the nostrils.

Using a verbal command (e.g. saying the pen's number) the patient is asked to take a sniff.

During the investigation the patient is blindfolded, e.g., through a **sleeping mask**; for lateralised testing one of the nares is blocked with tape, e.g., 3M Microfoam.

Only at the end of the investigation patients receive information about the results of the test.



Sniffin' Sticks - Instructions

Other shown on the previous slide the investigator is advised to wear **odorless gloves**. Thin gloves made from cotton seem to suit this purpose very well.



Sniffin' Sticks - Instructions

Testing should always be performed in a **well-ventilated room** with little or no odor.

There should not be any **disturbance** during measurements.

- The patient should neither have eaten nor drunk anything other than water 15 min prior to the measurements. This rule extends also to smoking, and the use of drops or chewing gum.

Sniffin' Sticks - Instructions

The test is comprised of 3 parts:

- **threshold test** for butanol or phenylethylalcohol
- **discrimination** of odorants
- **identification** of odorants

The test ought to be carried out in the following order:

threshold - **discrimination** - **identification**

Sniffin' Sticks - Instructions

Between the 3 parts of the test
(**threshold** - **discrimination** - **identification**)
should be breaks of 3-5 minutes each.

Threshold for butanol (but) or phenylethylalcohol (pea)

Pens are labelled with red numbers from 1-16. Pens with the red cap and the red numbers contain the odorant at a certain dilution. Patients always receive three pens. Two of those pens contain solvent, the third pen (the one with the red cap) contains but/pea.

Sniffin' Sticks - Instructions - threshold

Using a verbal command (e.g. saying the pen's number) the patient is asked to take a sniff.

The order of presentation of pens varies from triplet to triplet as follows: RedGreenBlue, BlueRedGreen, GreenBlueRed, RedGreenBlue etc.

Sniffin' Sticks - Instructions - threshold

Triplets of pens are presented at intervals of 20-30 sec. A simple clock is extremely helpful to standardize the duration of these intervals.

Sniffin' Sticks - Instructions - threshold

The pen with the red cap and the number 16 (in red) contains the lowest concentration (highest dilution step). The pen with the red cap and the number 1 (in red) contains the highest concentration (lowest dilution step).

Sniffin' Sticks - Instructions - threshold

Before beginning with threshold measurements, using pen number 1 patients are familiarised with the odor of but/pea.

Patients are instructed that the odorant is presented in extremely low quantities together with 2 other pens which contain solvent only: "Your task is to find out which one of the three pens smells different".

During measurements patients are blindfolded, e.g., using a sleeping mask.

Sniffin' Sticks - Instructions - threshold

At the beginning of the test patients are presented triplets in dilution steps 16, 14, 12 etc. or 15, 13, 11 etc., respectively, until the patient correctly identified the but/pea-containing pen **two times in a row** at the same dilution. This dilution is the **starting point** of the threshold measurements.

Sniffin' Sticks - Instructions - threshold

The following shows an example to get to the starting point.

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16								

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14								
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12								
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10								
	11								
	12	-							
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10	x							
	11								
	12	-							
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8								
	9								
	10	x -							
	11								
	12	-							
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6								
	7								
	8	-							
	9								
	10	x -							
	11								
	12	-							
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

dilution step	1								
	2								
	3								
	4								
	5								
	6	x							
	7								
	8	-							
	9								
	10	x -							
	11								
	12	-							
	13								
	14	-							
	15								
	16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7							
	8	-						
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7							
	8	-						
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
16	-							

In this example the starting point is reached at dilution step number 6 !

Sniffin' Sticks - Instructions - threshold

After the starting point has been found, the next higher dilution step is offered. The next turning point is the odor concentration which is not correctly identified.

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X					
	8	-						
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X					
	8	-						
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X					
	8	-	X					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X					
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified -: but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X					
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
16	-							

In this example the second turning point is reached at dilution step number 8!

Sniffin' Sticks - Instructions - threshold

Now the patients receive the next higher concentration, until a certain dilution step is identified correctly twice in a row. This will be turning point number 3.

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X	X				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5							
dilution step	6	X X						
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

dilution step

1								
2								
3								
4								
5								
6	X X			-				
7		X X		X -				
8	-	X -						
9								
10	X -							
11								
12	-							
13								
14	-							
15								
16	-							

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5				X			
dilution step	6	X X			-			
	7		X X		X -			
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X				
dilution step	6	X X		-				
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X				
dilution step	6	X X		-				
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

In this example the third turning point is reached at dilution number 5!

Sniffin' Sticks - Instructions - threshold

This procedure is continued until 7 turning points have been established.

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X				
dilution step	6	X X		-	-			
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X				
dilution step	6	X X		-	-			
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Turning point 4 is at dilution step number 6!

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X		X		
	6	X X		-		-		
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

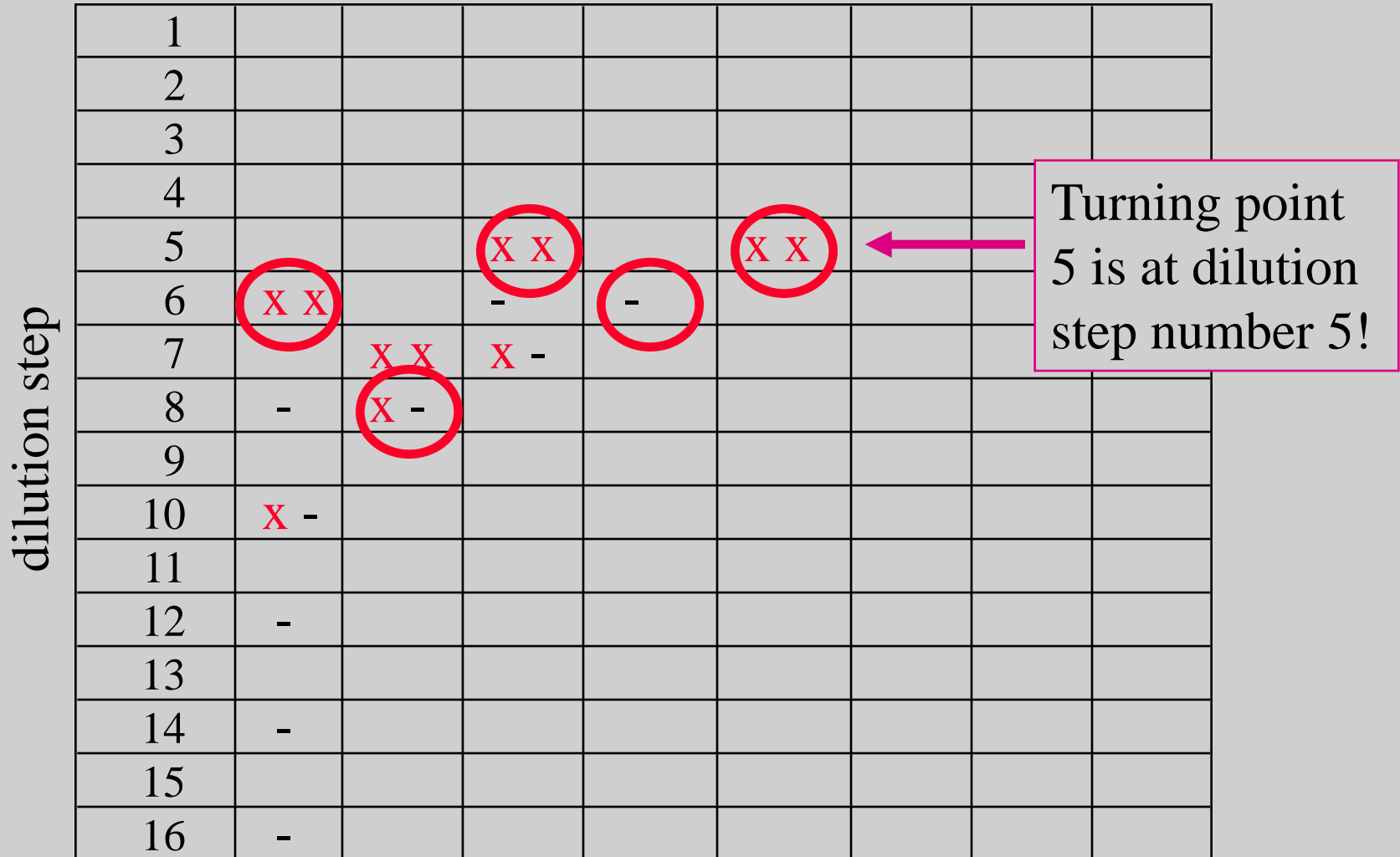
x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X		X X		
	6	X X		-		-		
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified



Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X		X X		
	6	X X		-	-		X	
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

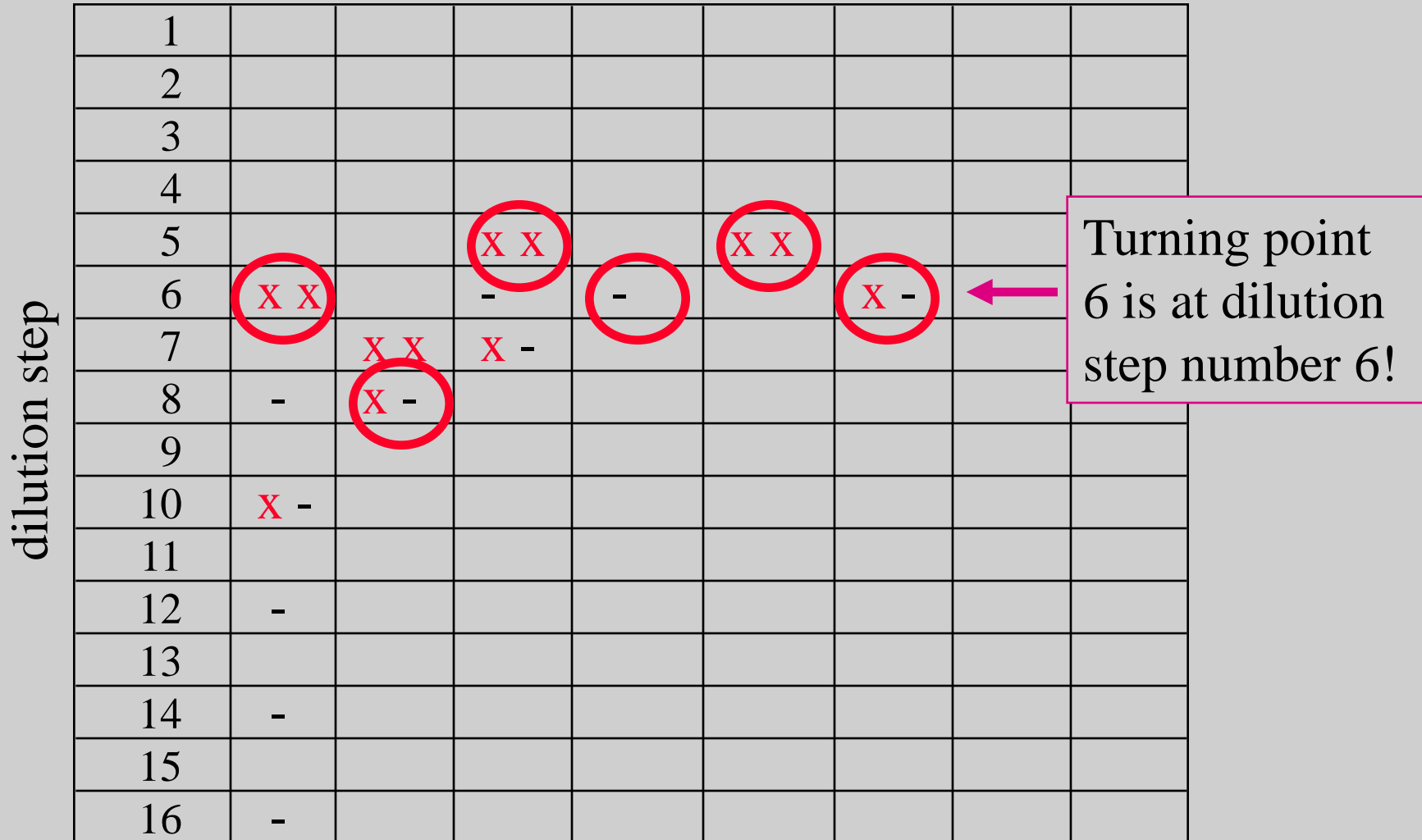
x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X		X X		
	6	X X		-	-		X -	
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified



Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4							
	5			X X		X X		-
	6	X X		-	-		X -	
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4						X	
	5			X X		X X	-	
dilution step	6	X X		-	-	X -		
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

Sniffin' Sticks - Instructions - threshold

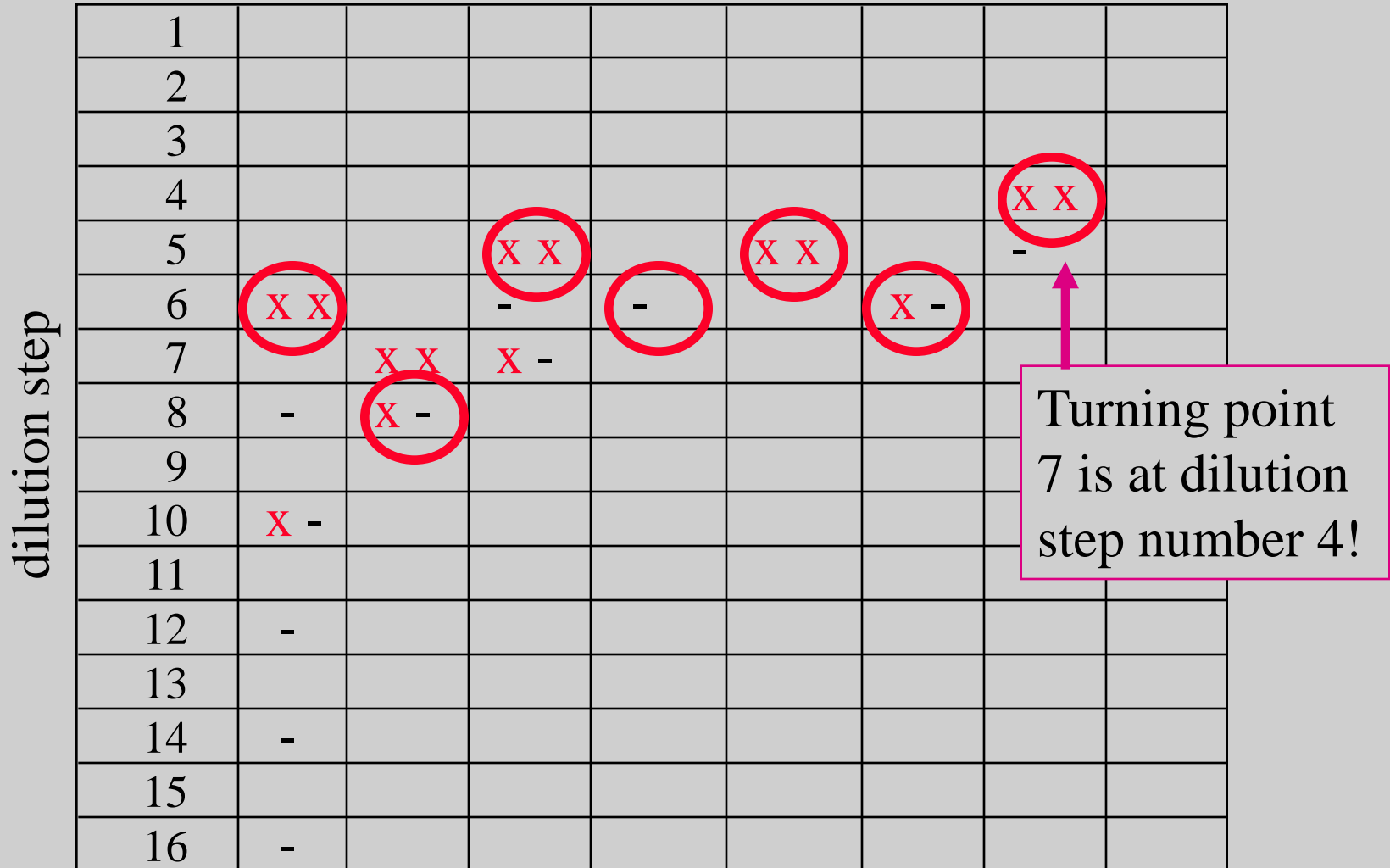
x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4						X X	
	5			X X		X X	-	
	6	X X		-	-	X -		
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified



Sniffin' Sticks - Instructions - threshold

The threshold is defined as the mean of the last 4 turning points (turning points 4-7).

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

	1							
	2							
	3							
	4						X X	
	5		X X		X X		-	
	6	X X	-	-		X -		
	7		X X	X -				
	8	-	X -					
	9							
	10	X -						
	11							
	12	-						
	13							
	14	-						
	15							
	16	-						

dilution step

Sniffin' Sticks - Instructions - threshold

x: but/pea correctly identified - : but/pea not identified

dilution step

1								
2								
3								
4							X X	
5			X X		X X		-	
6	X X		-	-		X -		
7		X X	X -					
8	-	X -						
9								
10	X -							
11								
12	-							
13								
14	-							
15								
16	-							

The threshold is 5.25 !

discrimination of odors

Pens are labelled with green numbers form 1-16. Target pens (to be discriminated) have a green cap. Patients are offered 16 triplets labelled with the same numbers. Two of the pens contain the same odor, the pen with the green cap contains a different odor.

Sniffin' Sticks - Instructions - discrimination

Using a verbal command (e.g. saying the pen's number) the patient is asked to take a sniff.

The order of presentation of pens varies from triplet to triplet as follows: **RGB**, **BRG**, **GBR**, **RGB** etc.

Identification of odors

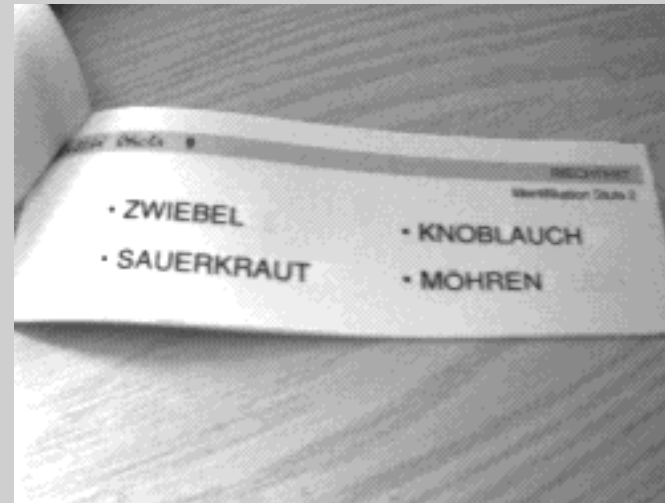
Pens are labelled with blue numbers from 1-16.

Sniffin' Sticks - Instructions - Identifikation

Patienten select one of the 4 items which best describes the odor.

This selection has to be made, even if patients are uncertain whetehr they did smell anything, and regardless whether patients believed that they smelled nothing ("forced choice").

Example for pen No. 9:
Patients are offered the 4 items "onion, sauerkraut, garlic, carrot". In this case "garlic" would be correct.



Sniffin' Sticks - Instructions

This was the test !

Now for analysis of the results.

Sniffin' Sticks - Instructions

The test result is the sum of the scores from **odor threshold**, odor **discrimination** und odor **identification**. In case this **TDI**-score is ≤ 16.5 , the patient is considered **functionally anosmic**.

Sniffin' Sticks - Instructions

In case the patient has a **threshold > 1.0** (meaning that he was able to differentiate between but/pea and solvent), the test result is the sum of the scores from odor **threshold**, odor **discrimination** und odor **Identification**. In case this **TDI**-score is **> 30.5**, the patient is considered **normosmic**, otherwise **hyposmia** is considered.