

*Injection Techniques Questionnaire (ITQ)
WorldWide Results*

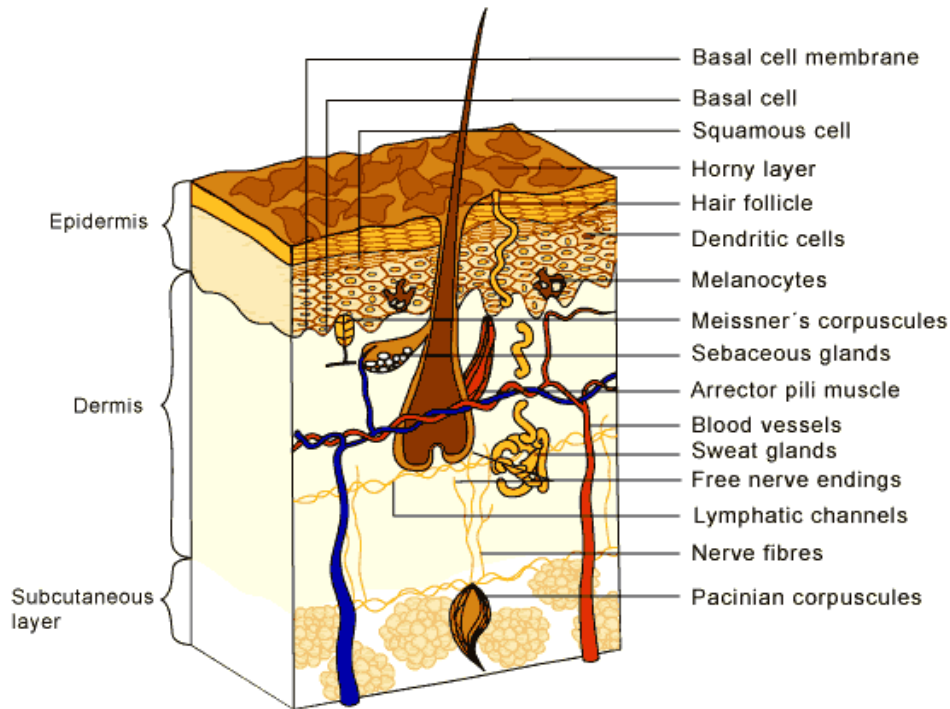
2014-2015

Injection Pain



BACKGROUND

The Innervated Dermis



Nerve endings detect:

pain

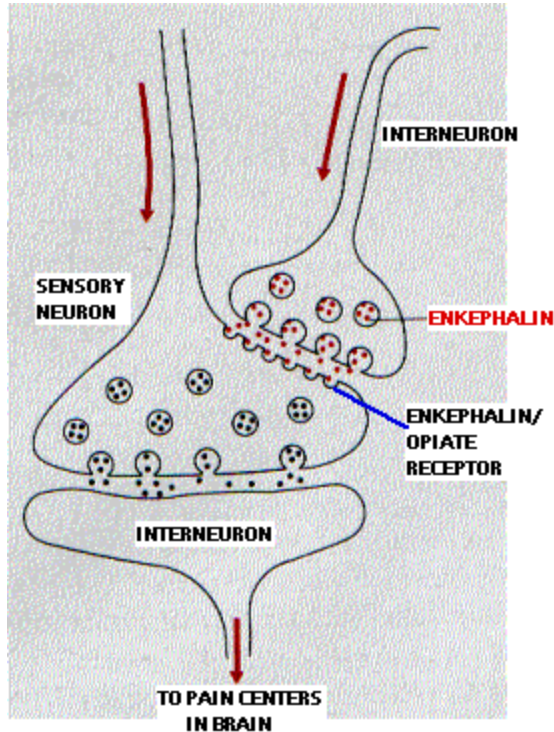
pleasure

temperature

vibration

itch

Pain receptors



Nociceptors send signals for **pain or burning**

Most of these are localized **at the junction** of the epidermis and dermis

What have we learned from previous studies?

- Pain receptors are clustered in the dermis
- The pain of an injection is reduced by:
 - Thinner gauge, shorter needles (e.x. 4mm)
 - Ultra-thin wall
 - 5-bevel tip vs 3-bevel
 - Slower insertion

DESCRIPTIVE STATISTICS

Do patients find injections painful? If so, how frequently?

Have pain?	N	%
Yes	5045	55.4
No	4069	44.6

Frequency	%
Always painful	2.6
Often painful (several times a week)	12.9
Sometimes painful (several times a month)	45.6
Almost never painful (several times a year)	38.9

**COMPARATIVE
STATISTICS: DEMOGRAPHICS**

Is pain associated with gender?

		Pain	
		Yes	No
Gender	Women	2619	1955
	%	52.2%	48.6%
	Men	2395	2068
	%	47.8%	51.4%

p < 0.000

Is pain associated with type of DM?

		Pain	
		Yes	No
DM type	T1DM	1390	1037
	%	57.3%	42.7%
	T2DM	2375	2602
	%	47.7%	52.3%
	GDM	21	52
	%	28.8%	71.2%

p < 0.000

Is pain associated with age category of respondent?

		Pain	
		Yes	No
Respondent	Adult	4454	3572
	%	55.5%	44.5%
	Adolescent	233	157
	%	59.7%	40.3%
	Child	123	66
	%	65.1%	34.9%
	3 rd Party	95	66
	%	59.0%	41.0%

p = 0.019

**COMPARATIVE
STATISTICS: ASSOCIATIONS**

Is pain associated with bleeding?

		Pain	
		Yes	No
Bleeding	Yes	3836	1607
	%	70.5%	29.5%
	No	1196	2422
	%	33.1%	66.9%

p < 0.000

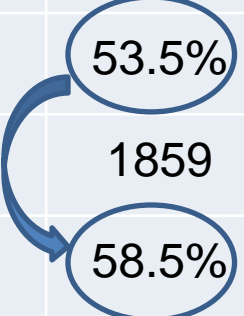
Is pain associated with injecting through clothes?

		Pain	
		Yes	No
Thru Clothes	Yes	508	200
	%	71.8%	28.2%
	No	4514	3837
	%	54.1%	45.9%

p < 0.000

Is pain associated with not warming up cold insulin before injecting?

		Pain	
		Yes	No
Warm it up	Yes	2199	1911
	%	53.5%	46.5%
	No	1859	1317
	%	58.5%	41.5%



p < 0.000

Is pain associated with skipping injections more frequently?

		Pain	
		Yes	No
Skip Injections	Yes	2795	1536
	%	64.5%	35.5%
	No	2227	2503
	%	47.1%	52.9%

p < 0.000

Is pain associated with patient-reported hypoglycemia?

		Pain	
		Yes	No
Hypos	Yes	3156	2010
	%	61.1%	38.9%
	No	1830	2016
	%	47.6%	52.4%

p < 0.000

Is pain associated with patient-reported hyperglycemia?

		Pain	
		Yes	No
Hypers	Yes	2541	1600
	%	61.4%	38.6%
	No	2381	2342
	%	50.4%	49.6%

p < 0.000

Is pain associated with LH?

		Pain	
		Yes	No
LH	Yes	1309	758
	%	63.3%	36.7%
	No	2211	2674
	%	45.3%	54.7%

p < 0.000

Is pain associated with injecting into LH?

		Pain	
		Yes	No
Inject into LH	Yes	975	559
	%	63.6%	36.4%
	No	1090	965
	%	53.0%	47.0%

p < 0.000

Is less pain associated with correct rotation?

		Pain	
		Yes	No
Correct Rotation	Yes	2495	2679
	%	48.2%	51.8%
	No	1177	891
	%	56.9%	43.1%

p < 0.000

Is pain associated with lifting a skin fold?

		Pain	
		Yes	No
Lift skin fold	Yes	1894	1782
	%	51.5%	48.5%
	No	660	552
	%	54.5%	45.5%

p = 0.079

Is pain associated with reusing needles?

		Pain	
		Yes	No
Reuse	Yes	2057	1658
	%	55.4%	44.6%
	No	1702	2046
	%	45.4%	54.6%

p < 0.000

Is pain associated with number of times needle is used?

		Pain	
		Yes	No
Number of times Needle Used	2	588	534
	%	52.4%	47.6%
	3-5	863	704
	%	55.1%	44.9%
	6-10	362	246
	%	59.5%	40.5%
	>10	298	176
	%	62.9%	37.1%

p < 0.000

Is frequency of pain associated with number of times needle used?

		Frequency of Pain			
		Always	Often	Sometimes	Almost Never
Number of times Needle Used	2	33	143	341	222
	%	4.5%	19.4%	46.1%	30.0%
	3-5	31	153	541	287
	%	3.1%	15.1%	53.5%	28.4%
	6-10	13	54	229	107
	%	3.2%	13.4%	56.8%	26.6%
	>10	15	61	175	80
	%	4.5%	18.4%	52.9%	24.2%

Percent of 'Almost Never' declines as reuse increases

p = 0.011

**COMPARATIVE
STATISTICS: OUTCOMES**

What is the association between pain and HbA1c?

PAIN	Mean HbA1c	N	SD
Yes	8.62	3554	2.409
No	8.31	3388	1.855
Total	8.47	6942	2.162

$\Delta = 0.31$

$p < 0.000$

What is the association between pain and TDD?

PAIN	Mean TDD	N	SD
Yes	51.0	3569	33.2
No	46.1	3484	31.3
Total	48.6	7053	32.3

$\Delta = 4.9$ IU

p < 0.000

What is the association between pain and BMI?

PAIN	Mean BMI	N	SD
Yes	27.1	4832	6.6
No	28.1	3936	6.7
Total	27.5	8768	6.6

$\Delta = 1.00$

$p < 0.000$

What is the association between pain and Age?

PAIN	Mean Age	N	SD
Yes	48.9	5030	18.5
No	52.1	4050	18.5
Total	50.3	9080	18.6

$\Delta = 3.2$
years

p < 0.000

Conclusions

- About half of injectors report having pain on injection
- Of these, 4 out of 5 report having painful injections only several times a month or year (i.e. not with every injection)
- Groups with higher frequency of pain are: T1DM patients, children, adolescents and women
- Pain is associated with several other disorders, without obvious causative relationship: bleeding, injecting through clothes, using cold insulin, skipping injections, hypo- and hyperglycemia, LH, injecting into LH, incorrect site rotation, higher HbA1c, lower BMI, younger age and higher TDD.
- Pain is also associated with needle reuse and seems to increase as a function of the number of times the needle is reused.