

"Masseur": A Therapist or Sexual Abuser?

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Abstract

Massage therapy is the scientific manipulation of the soft tissues of the body by applying pressure, holding & moving muscles and body tissues. This therapy releases stress and advance the function and health of the body. This therapy involves an element of trusts from massage therapists but in recent years there have been a rise in number of sexual assault by massage therapist. The therapist during massage therapy maliciously touches or passes demeaning comments to partially dressed customers. The clients after the incident do not come forward to register a complaint and some victims even feel ashamed to discuss as if they did something wrong or invited the sexual assault. Moreover, the investigating agencies are also facing difficulties in ascertaining the sexual assault charges as several cases regarding sexual assault in massage parlors are still lying pending with many laboratories due to unavailability of facilities or appropriate scientific methods. Hence, need of the hour is to unequivocally establish a technique for analysis of massage oil related sexual assault cases. In this paper inner wears of victim were analysed by two techniques i.e. ATR-FTIR and GC-MS. Various fragrance additives of massage oil alongwith some other chemical components including lignan, phytosterols, triterpene, sesquiterpene, antioxidant, saturated fatty acid, di-ester and skin conditioning agent that were originally contributed from the body odour & cosmetics/perfumery products of victim on her inner wears were detected. This research publication does have societal outreach as it makes the public at large aware about these unreported & hidden sexual crime committed by massage therapist under the guise of massage in massage parlors and delineate an urgency to apprehend these massage therapist. Their wrongful act in the guise of massage can be proved scientifically and can put them behind the bar.

Keywords: Massage therapy; Massage parlor; Massage therapist; Masseur; Sexual assault; Sexual abuser; Customer; ATR-FTIR; GC-MS.

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Introduction

Massage therapy is a meticulous manipulation of soft tissues by hands to release stress¹ and advance the function & health of the body as depicted in Fig. 1. It is one of the oldest health care practices known to history. The word 'Massage' is a derivation from the greek "massein" or the french "masser" both of which mean: to knead. This therapy is considered one of the most effective healing modalities and has been used by conventional as well as alternative medical communities. It is also covered by some health insurance plans.³ Now a days this therapy has been highly taken by affluent customer in lavish massage parlors and it is perceived as 'bed of roses' reserved for the wealthy.



Fig. 1: Benefits of Massage therapy.²

In massage parlors, a male massage therapist 'masseur' or a female therapist "masseuse" typically applied the carrier oil blended with aromatic essential oil on customer to create calm and soothing effect.^{4,6} The forerunners of today's massage therapists in 1700s were called rubbers. Rubbers were experts in treating orthopedic problems with manual rubbing and friction. They established the occupation from which the profession of massage therapy later developed. Rubbers had little education, but possessed a knack for hands-on therapy.⁷ Since last few years, unlicensed massage parlors have come into limelight as a place of human trafficking. Many unlicensed massage parlors were raided and a large number of sex workers were arrested.

It was presumed that only unlicensed massage parlors were indulged in flesh trade and the licensed parlors did not allow any antisocial activity. But these days, complaints regarding sexual assault have been registered even against licensed massage parlors and it has gained so much disrespect & fear amongst the public. Sexual assault in massage parlors involves touching the delicate areas of the body possessing apocrine sweat glands like areola, tits and parts of the external genitalia.^{8,9}

This therapy involves an element of trust from massage therapists but some masseurs at the time of massage services have been taking the advantage of vulnerable situation, maliciously touch or pass demeaning comments to partially dressed customer (victim). At the time of massage, the partially dressed customer are so focused on being relaxed that they even don't realize the assault i.e. malicious touches by the masseur and become confused about whether they were sexually assaulted or not by masseur.

The moment the customer realizes the assault, they are mentally unprepared to respond to sexual assault. Many customer even feel ashamed to discuss as if they did something wrong or somehow invited the sexual assault and they even don't register a complaint against the massage therapist.

Being sexually assaulted in a massage parlor is particularly alarming because the environment places the survivors in a completely vulnerable position. Therefore, sexual assault that arouse during massage therapy is a serious matter of concern.

Several cases regarding sexual assault in massage parlors are still lying pending with many laboratories due to unavailability of facilities or appropriate scientific methods to prove the assault. CFSL Chandigarh like wise other laboratory also

received a case related to sexual assault committed on a British lady in a massage centre of a renowned hotel. The investigating agency was facing difficulty in ascertaining the claimed charges; hence, submitted the seized inner wears of victim in CFSL Chandigarh with a challenge to ascertain whether sexual assault was committed on victim or not. Henceforth, a forensic attempt was made to establish a scientific method to ascertain these types of assault cases. In this study scientific, methodical and systematic plan of action was developed to analyze the trace evidence and to prevent loss of potential evidence.

Massage oil played an important role as Trace Forensic Evidence and two instrumental techniques i.e. Attenuated Total Reflectance - Fourier Transform Infra Red (ATR - FTIR) & Gas Chromatography - Mass Spectrometry (GC - MS) were employed for forensic detection, identification and comparison of traces evidences establishing Locard's exchange.

Materials & Methods

Samples and reagents

Two cloth parcels related to sexual assault attempted on British lady by masseur in renowned hotel were submitted by Chandigarh police in Chemistry division of CFSL, Chandigarh. On opening these parcels, one parcel was found to contain inner wears of victim i.e. one black coloured underwear & one black coloured bra and second cloth parcel was found to contain small dark brown coloured plastic bottle having few ml of viscous liquid stated to be massage oil. These exhibits were respectively marked as Exhibit-1A, Exhibit-1B and Exhibit-2 in the laboratory as depicted in Fig. 2 to Fig. 4. As per submitted FIR, the masseur during massage has sexually abused the British lady by touching her breast and genital. The exhibits were submitted in the laboratory to know whether the inner wears of British lady were having massage oil or not.



Fig. 2: Exhibit-1A [black coloured panty (underwear) with white coloured laces on its border bearing company label of "M & S" brand].



Fig. 3: Exhibit-1B [Black coloured bra bearing company label of "M & S" brand].



Fig. 4: Exhibit-2 [Small dark brown coloured plastic bottle containing transparent few ml of viscous liquid with aromatic pleasant odour stated to be massage oil].

The solvent used for extraction was of LC grade (Merck, German).

Equipment

Direct examination of exhibits was done under ATR-FTIR and then GC-MS was used to corroborate the findings.

(a) ATR-FTIR analysis

Selection of portions on exhibits for direct analysis

One drop of Exhibit-2 (liquid form) was directly analysed by ATR- FTIR whereas some portions from different parts of inner wears i.e. on Exhibit-1A and Exhibit-1B were selected for direct analysis which is tabulated in table 1.

Instrumental conditions

FTIR analysis of the exhibits was executed with a Perkin Elmer-Spectrum 400 equipped with Attenuated Total Reflectance (ATR) sampling accessory. FTIR spectrums were obtained for the exhibits in the range 4000-650 cm^{-1} . Various vibrational peaks of diverse intensities were observed at different wave numbers (cm^{-1}) where Y-axis of the spectra elucidates the percentage of transmittance (%T) and X-axis point up the wave numbers (cm^{-1}).

Table 1: Portion selected from different parts of inner wears i.e. Exhibit-1A and Exhibit-1B for analysis.

Exhibit	Portion/part of Exhibits for analysis
Exhibit-1A	UBI - Underwear back Inner portion
	UBO - Underwear back outer portion
	UFI - Underwear front inner portion
	UFO - Underwear front outer portion
	ULI - Underwear lower inner portion
	ULO - Underwear lower outer portion
Exhibit-1B	BLI - Inner portion in left side of bra
	BLO - Outer portion in left side of bra
	BRI - Inner portion in right side of bra
	BRO -Outer portion in right side of bra
Spiked portion of Exhibit-1A with control massage oil (Exhibit-2)	S-U - Spiked on underwear [Tiny portion on underwear (distant from the above selected places to avoid contamination) was spiked with a minute drop of control massage oil (Exhibit-2) through a capillary]
Spiked portion of Exhibit-1B with control massage oil (Exhibit-2)	S-B - Spiked on bra [Tiny portion on bra (distant from the above selected places to avoid contamination) was spiked with a minute drop of control massage oil (Exhibit-2) through a capillary]

(b) GC-MS Analysis

Extraction with chloroform

Few ml of chloroform was added to both Exhibit-1A and Exhibit-1B in separate beakers and then filtered through Whatman No.1 filter paper (GE Healthcare, UK). The filtrated samples were concentrated to 2ml and stored at 4°C.

Similarly 1ml of chloroform was added to 1ml of Exhibit-2 (control massage oil) and stored at 4°C.

Instrumental conditions

PerkinElmer Clarus 500 GC coupled with a Clarus 500 Quadrupole MS was used. The elite 5 MS column was a 30-m with 0.25- mm I.D. and 0.25- μm film thickness. Helium was used as a carrier gas at a constant flow of 1 ml/min. Splitless injection was used with a splitless time of 60s. The injector and interface line temperature were held at 250 °C and 330 °C respectively. Oven temperature was held at 90 °C for 1 min and increased to 300 °C at the rate of

15 °C/min and held at this temperature for 6 min.

The MSD conditions: Ionisation energy 70 eV, ion source temperature 200 °C, mass range 41–410 amu, electron multiplier voltage (Auto tune + 200 V).

Sample injection volume: 1 µl

Compound identification

TurboMass software was used for data acquisition & processing and results were screened using the library of National Institute of Standard and Technology.

Results and Discussion

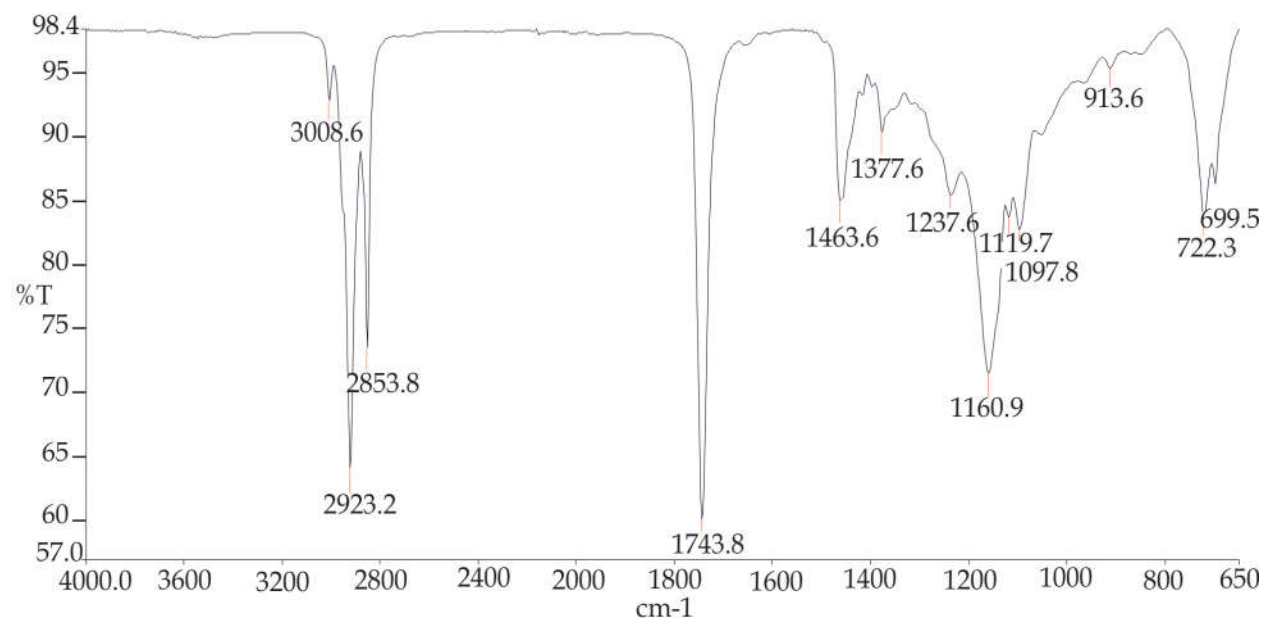


Fig. 5: Spectra 1: ATR-FTIR spectra of Exhibit-2 (control massage oil).

oil. The presence of bands at wave numbers 2923.2 cm^{-1} and 2853.8 cm^{-1} is assigned to the symmetrical and asymmetrical C-H stretching vibration of the CH_2 and CH_3 alkane groups from the alkyl rest of the triglycerides.

- The second region corresponds to the interval 1800–1600 cm^{-1} , one major band was obtained at 1743.8 cm^{-1} . This peak is assigned to stretching vibration of $\text{C}=\text{O}$; from the carbonyl functional group of the triglycerides.
- In interval 1600–1400 cm^{-1} , the third spectral region, only a single spectral band at 1463.6 cm^{-1} was obtained, which is assigned to the deformation vibrations of C-H bond of the alkane group.
- In the fourth spectral region, 1400–1300 cm^{-1} the band was observed at 1377.6 cm^{-1} assigned to deformation vibration of C-H bond of

(a) ATR-FTIR Analysis

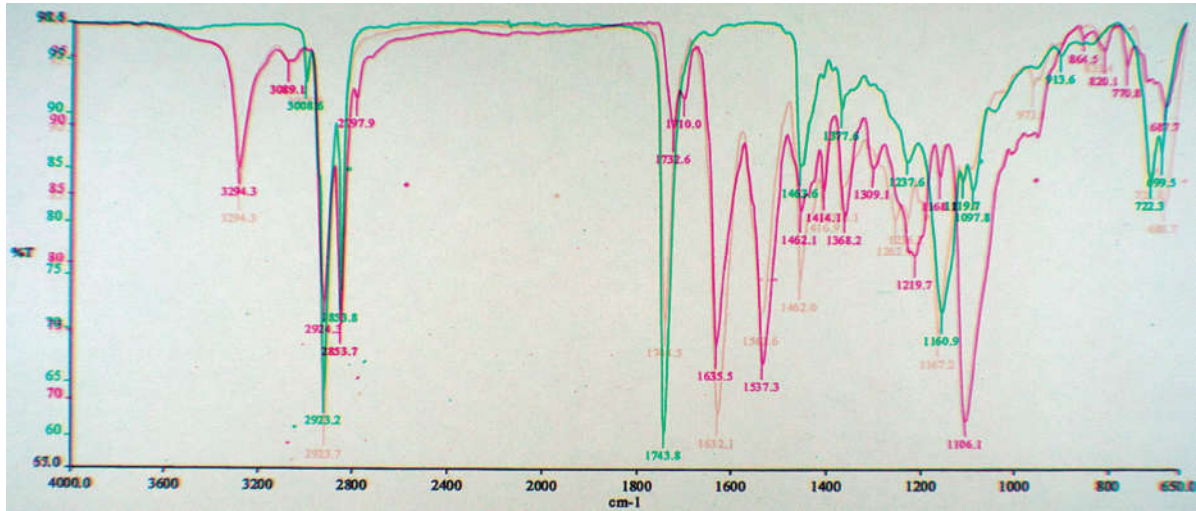
FTIR spectrum of Exhibit-2 (control massage oil) was appropriately interpreted to compare its findings with the trace evidences left on the Exhibit-1A and Exhibit-1B (inner wears). For in-depth elucidation, the spectrum was partitioned into five regions (Fig. 5).

- First spectral region, 3100–2800 cm^{-1} shows the absorption peak at 3008.6 cm^{-1} assigned to the C-H stretching vibration of the olefinic double bonds ($=\text{CH}$). This peak indicates the unsaturation degree of triglycerides in the

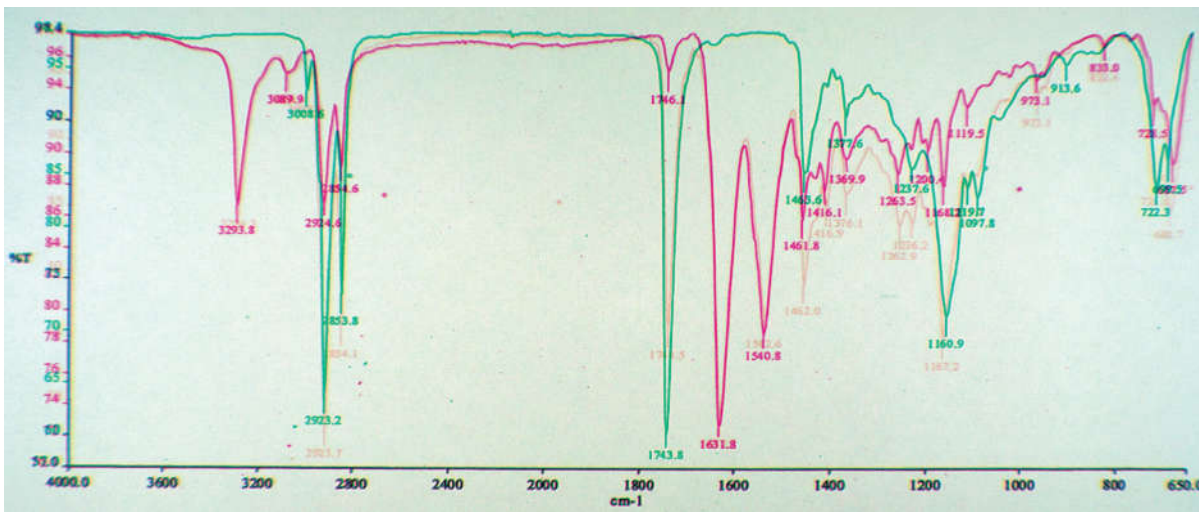
alkane group of triglyceride.

- The last interval 1250–700 cm^{-1} , the fifth region, bands were recorded at 1237.6 cm^{-1} , 1160.9 cm^{-1} , 1119.7 cm^{-1} and 1097.8 cm^{-1} assigned to stretching vibration of C-O bonds of ester from oil composition.

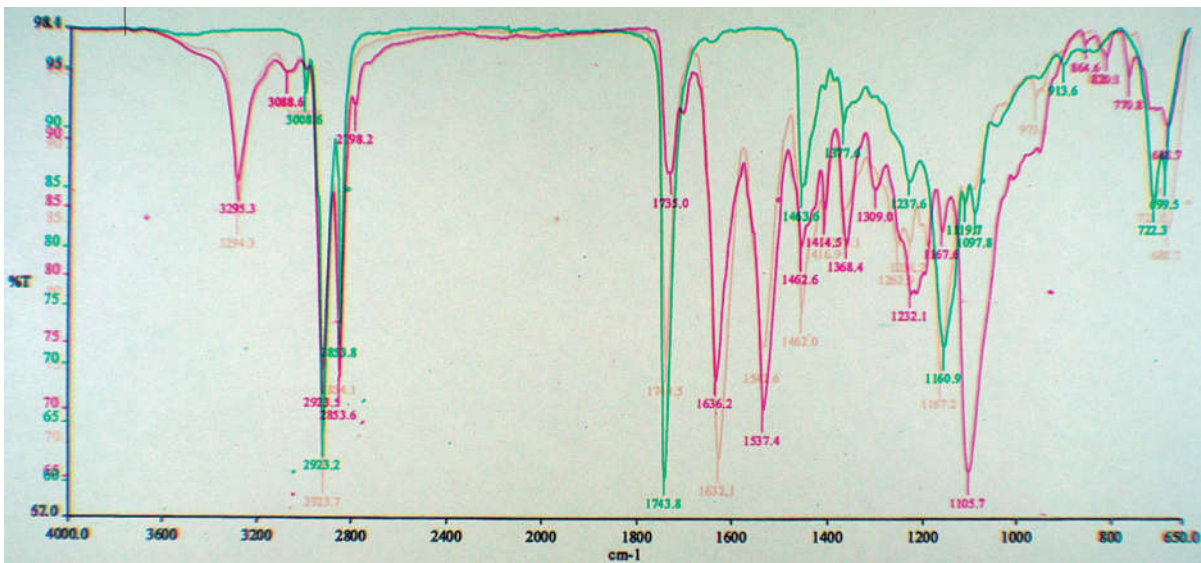
The FTIR spectra of Exhibit-1A (with different portions) S-U and Exhibit-2 were found superimposed and their overlay is depicted in Fig. 6 (containing spectra 2 to spectra 7); FTIR spectra of Exhibit-1B (with different portions), S-B and Exhibit-2 were also found superimposed and their overlay is depicted in Fig. 7 (containing spectra 8 to spectra 11). The evidently overlapping of the vibration bands of both Exhibit-1A and Exhibit-1B with the vibration bands of Exhibit-2 confirmed the presence of oil traces on Exhibit-1A & Exhibit-1B (inner wears of the victim). As depicted in



Spectra 2: UBI + Control massage oil + S-U

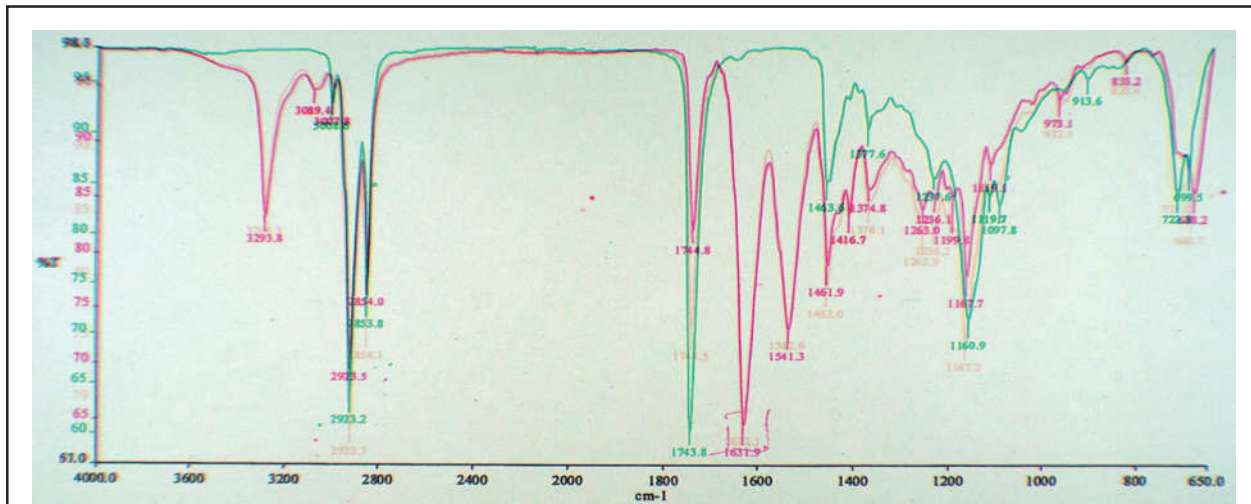


Spectra 3: UBO + Control massage oil + S-U

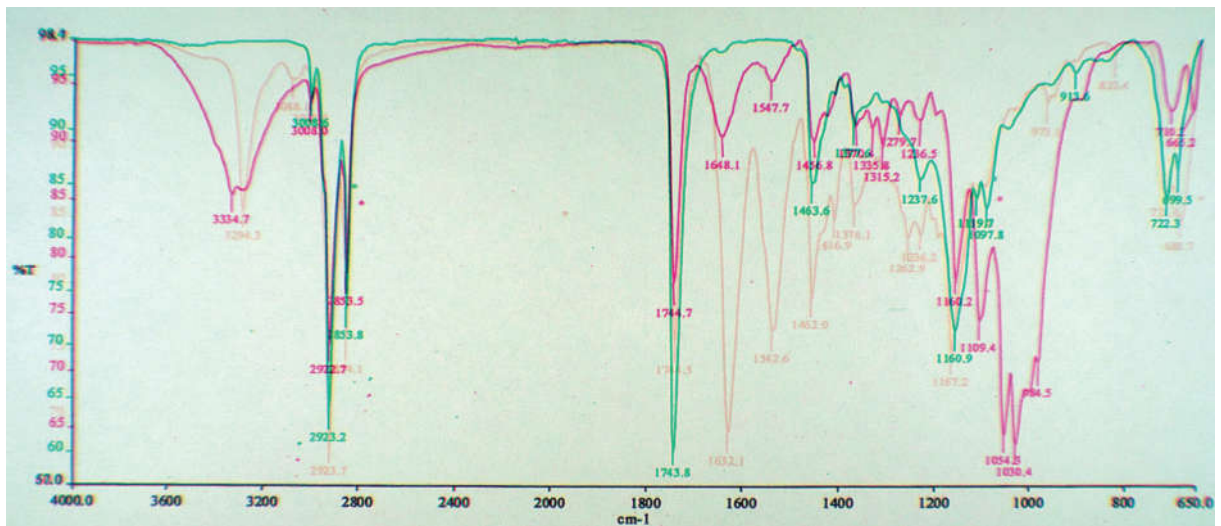


Spectra 4: UFI + Control massage oil + S-U

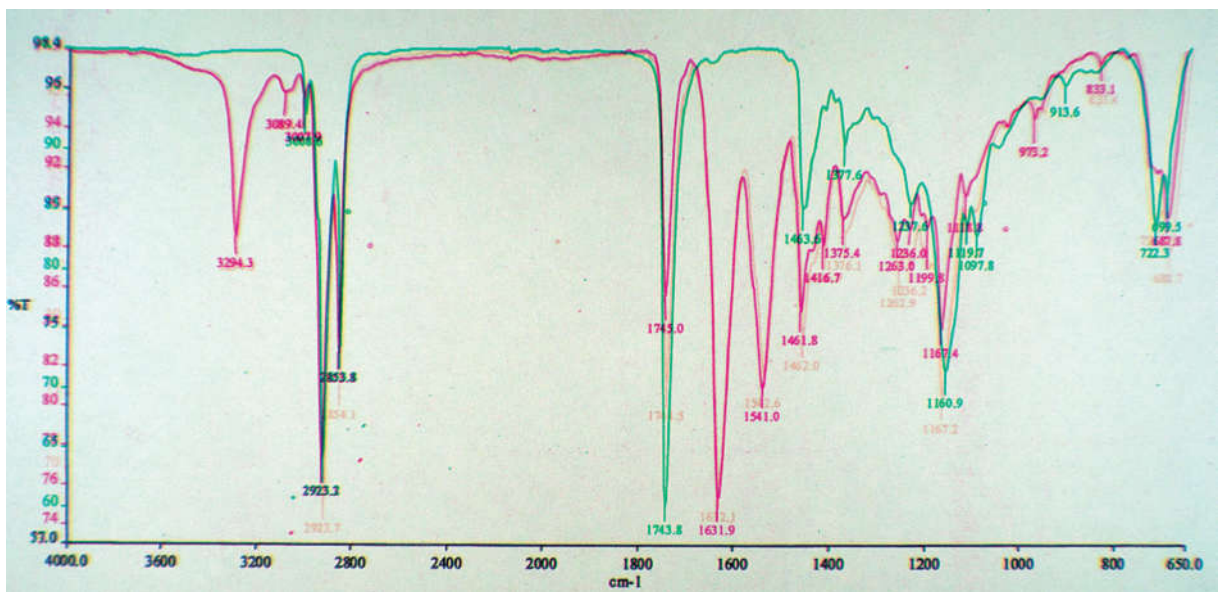
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Spectra 5: UFO + Control massage oil + S-U

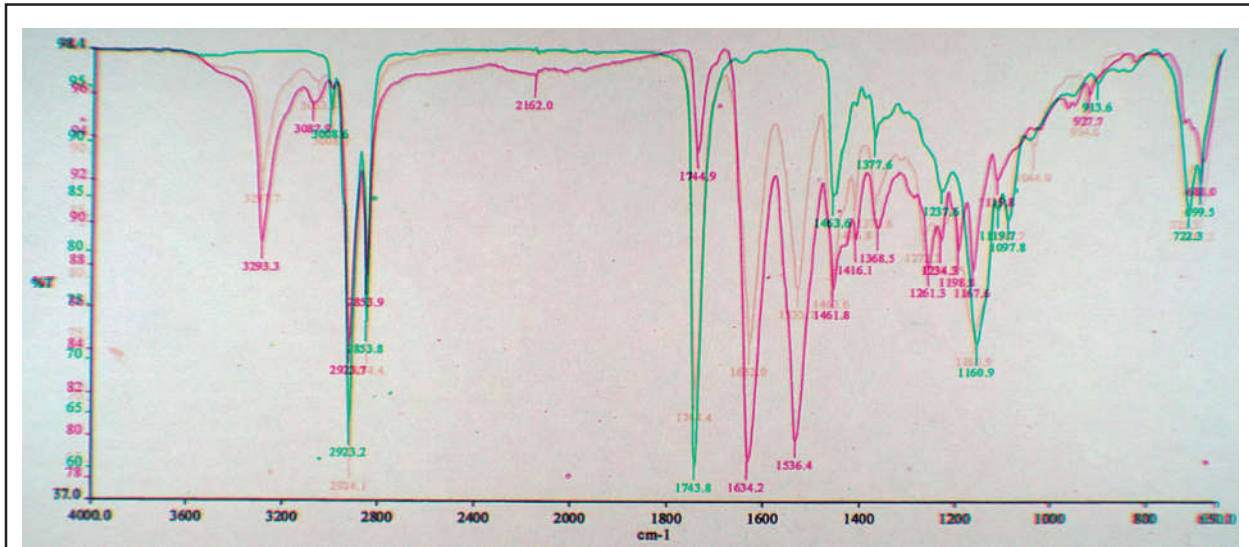


Spectra 6: ULI + Control massage oil + S-U

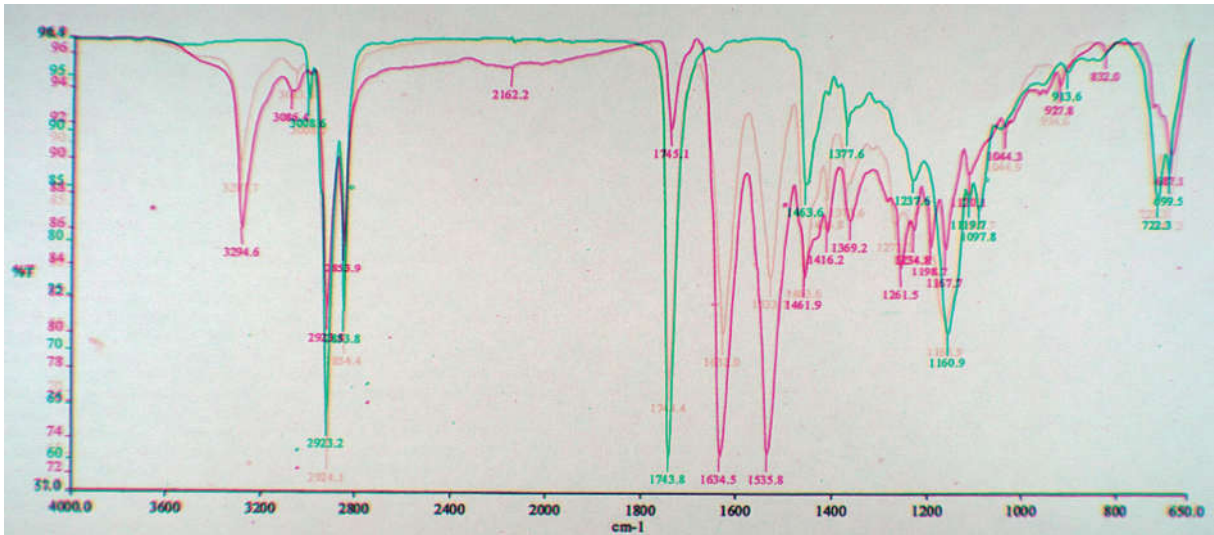


Spectra 7: ULO + Control massage oil + S-U

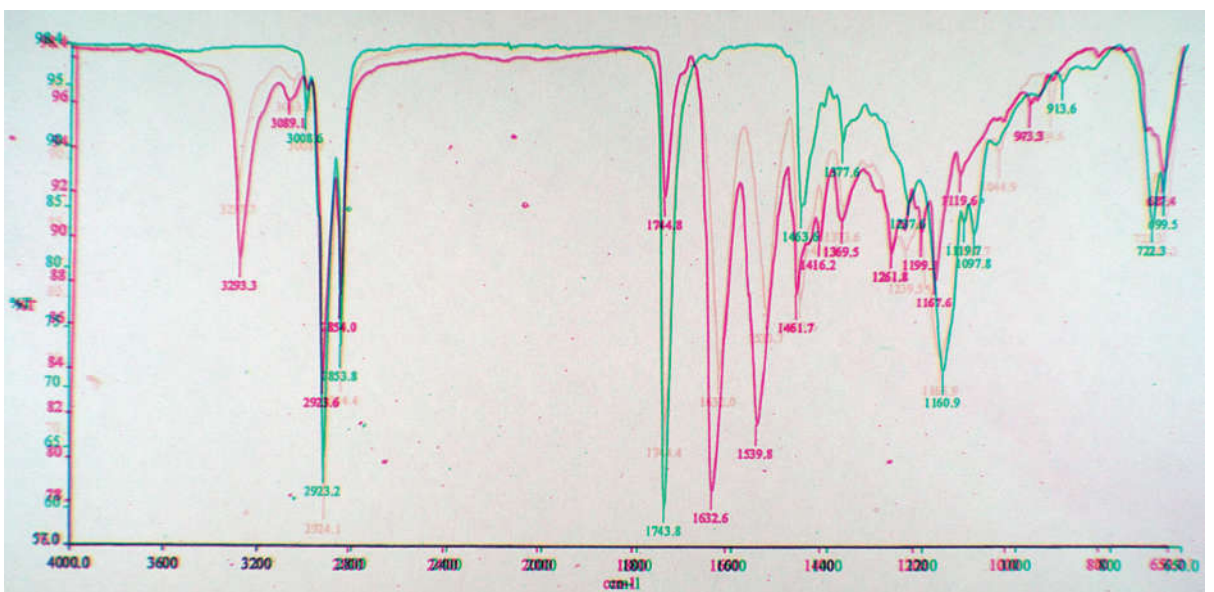
Fig. 6: The overlay of FTIR spectra's of different portion on Exhibit-1A (pink), Exhibit-2 (green) & S-U (light pink).



Spectra 8: BLI + Control massage oil + S-B



Spectra 9: BLO + Control massage oil + S-B



Spectra 10: BRI + Control massage oil + S-B

Continue

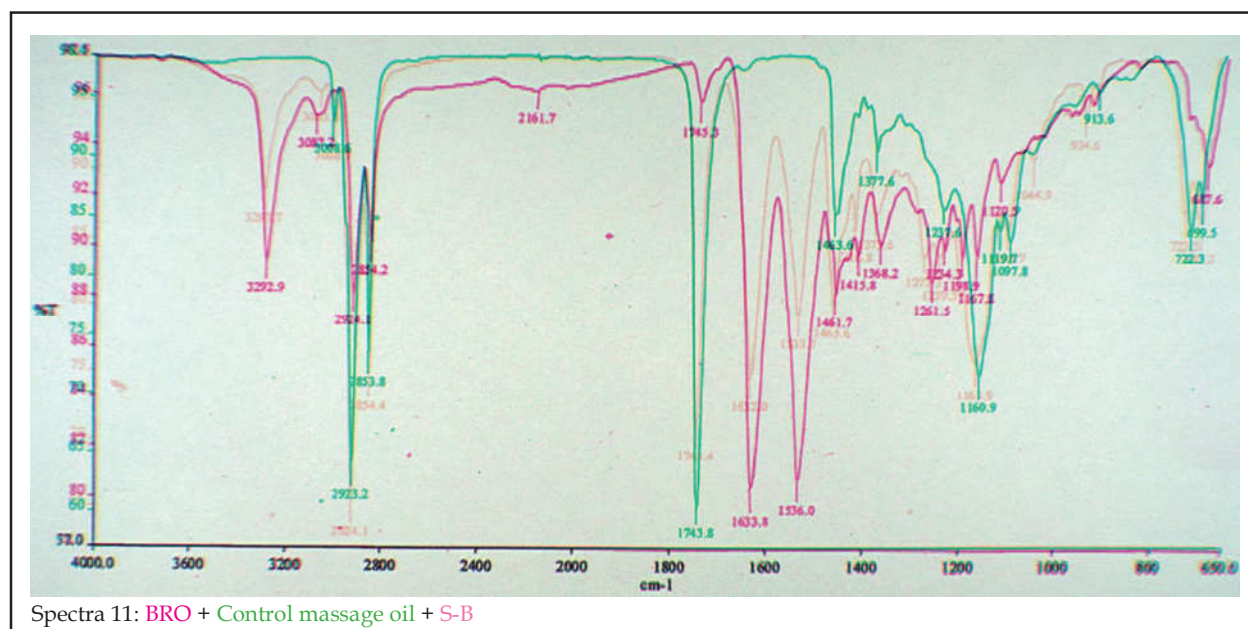


Fig. 7: The overlay of FTIR spectra's of different portion on Exhibit-1B (pink), Exhibit-2 (green) & S-B (light pink).

spectra 2 to spectra 11, the Exhibit-1A & Exhibit-1B (inner wears) were also having additional vibrational bands not overlapping with bands of control massage oil. These bands correspond to the vibrational peaks of alkyne, aromatic hydrocarbon; amide and primary alcohol group indicating the presence of extraneous material in addition to massage oil on inner wears. The functional group corresponding to each wave number of exhibits obtained in spectra 2 to spectra 11 by ATR-FTIR is tabulated in table 2.

(b) GC-MS Analysis

Various chemicals were detected in Exhibit-1A, Exhibit-1B and Exhibit-2 by GC-MS technique. These chemicals along with their respective retention time (R_t) are tabulated in table 3 and their resulting total ion chromatograms are depicted in Fig. 8 to Fig.10.

The chemicals detected in Exhibit-2 were acetate esters of monoterpenoid alcohol, fatty acid ester and aromatic primary alcohol which are used as fragrance and flavoring agents.¹⁰ These chemicals are incorporated in the oil to emanate pleasant floral aroma that create soothing and calming effect during massage. These chemicals were also detected in Exhibit-1A and Exhibit-1B that confirmed the presence of massage oil traces on the inner wears of the victim, especially on the inner portions. Additional fragrance ingredients along with some other chemical components including lignan, phytosterols, triterpene, sesquiterpene, antioxidant, saturated fatty acid, diester and skin conditioning agent were also detected in Exhibit-

1A and Exhibit-1B that were originally contributed from the body odour and cosmetics/perfumery products of victim on her inner wears.

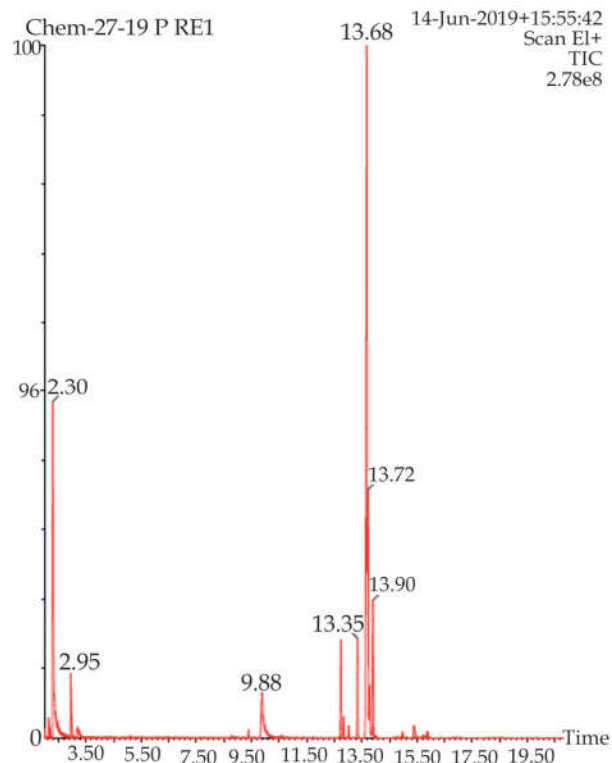


Fig. 8: Total ion chromatogram of Exhibit-1A.

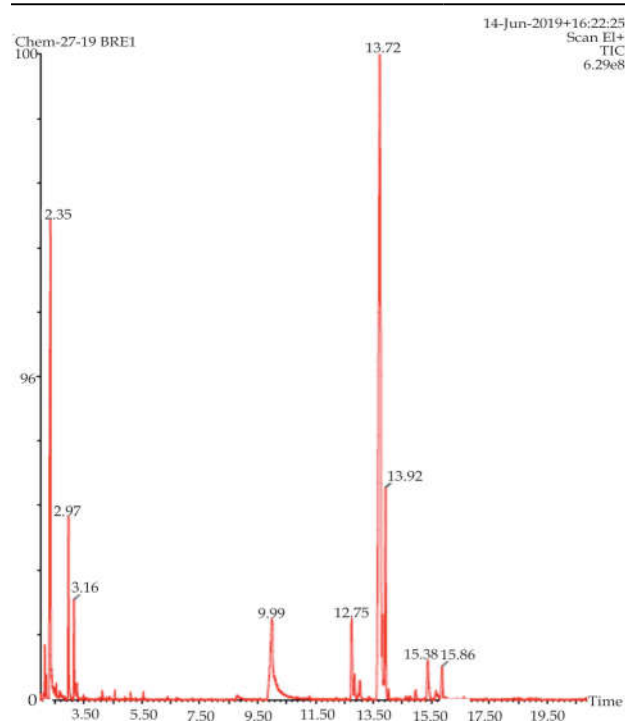
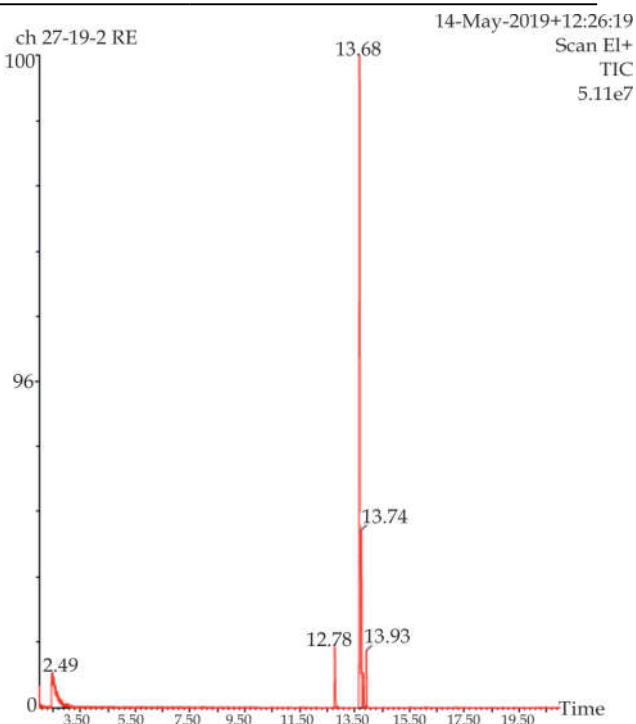
The results obtained by GC-MS have also corroborated the results obtained by ATR-FTIR. Both the techniques had confirmed the presence of massage oil on inner portions of inner wears of

Table 2: Wave numbers of obtained peaks in ATR-FTIR spectras of the exhibits.

Exhibit-1A (underwear cloth sample)				Exhibit-1B (Bra cloth sample)				Exhibit-2 (Control massage oil sample)	S-U	S-B	Functional group		
UBI	UBO	UFI	UFO	ULI	ULO	BLI	BLO	BRI	BRO				
3294.3	3293.8	3295.3	3293.8	3334.7	3294.3	3293.3	3294.6	3293.3	3292.9		3294.3	3297.7	Alkyne (C≡C)
3089.1	3089.9	3088.6	3089.4		3089.4	3087.9	3086.4	3089.1	3087.2		3088.1	3063.3	Aromatic Hydrocarbon
			3007.8	3008.0	3007.9					3008.6	3008.6	3008.7	Olefin (C=C)
2924.3	2924.6	2923.5	2923.5	2922.7	2923.3	2923.7	2923.8	2923.6	2924.1	2923.2	2923.7	2924.1	Alkane (C-H str)
2853.7	2854.6	2853.6	2854.0	2853.5	2853.8	2853.9	2853.9	2854.0	2854.2	2853.8	2854.1	2854.4	
2797.9		2798.2					2162.0	2162.2	2161.7				Alkyne (C≡C)
1732.6	1746.1	1735.0	1744.8	1744.7	1745.0	1744.9	1745.1	1744.8	1745.3	1743.8	1744.5	1744.4	Ester (C=O str)
1710.0													
1635.5	1631.8	1636.2	1631.9	1648.1	1631.9	1634.2	1634.5	1632.6	1633.8		1632.1	1632.0	Amide (C=O str)
1537.3	1540.8	1537.4	1541.3	1547.7	1541.0	1536.4	1535.8	1539.8	1536.0		1542.6	1533.7	Amide (N-H def)
1462.1	1461.8	1462.6	1461.9	1456.8	1461.8	1461.8	1461.9	1461.7	1461.7	1463.6	1462.0	1463.6	Alkane (C-H def)
1414.1	1416.1	1414.5	1416.7		1416.7	1416.1	1416.2	1416.2	1415.8		1416.9	1416.8	
1368.2	1369.9	1368.4	1374.8	1370.4	1375.4	1368.5	1369.2	1369.5	1368.2	1377.6	1376.1	1373.6	
		1309.0		1335.8	1315.2								
	1263.5		1263.0	1279.7	1263.0	1261.3	1261.5	1261.8	1261.5		1262.9	1272.3	Ester (C-O str)
1219.7	1200.4	1232.1	1236.1	1236.5	1236.0	1234.3	1234.8		1234.3	1237.6	1236.2	1239.5	
1168.1	1168.2		1199.8		1199.8	1198.8	1198.7	1199.3	1198.9		1167.2	1163.9	
1106.1	1119.5	1167.6	1167.7	1160.2	1167.4	1167.6	1167.7	1167.6	1167.8	1160.9	1119.8	1098.7	
		1105.7	1119.1	1109.4	1118.8	1119.8	1120.1	1119.6	1120.5	1119.7	1097.8		
				1054.3	1030.4		1044.3					1044.9	Primary alcohol (C-O str)
	973.1		973.1	984.5	973.2	927.8	927.8	973.3		913.6	973.1	934.6	Olefin (C-H def)
864.5		864.6											Aromatic hydrocarbon
820.1	833.0	820.1	833.2		833.1		832				833.4		(C-H def
770.8	728.5	770.8		710.2						722.3	721.0	723.3	disubstituted para)/ trisubstituted Olefin
687.7	687.5	688.7	688.2	665.2	687.8	688.0	687.1	687.4	687.6	699.5	688.7	687.3	(C-H def)/ aromatic (C-H def monosubstituted Olefin)

Table 3: Chemical compounds detected in Exhibits.

Exhibit-1A (underwear cloth sample)	Exhibit-1B (Bra cloth sample)	Exhibit-2 (Control Massage oil sample)
Benzene, 1,2-bis(9-borabicyclo[3.3.1]non-9-yloxymethyl) (13.68)	Benzene, 1,2-bis(9-borabicyclo[3.3.1]non-9-yloxymethyl) (13.72)	Benzene, 1,2-bis(9-borabicyclo[3.3.1]non-9-yloxymethyl) (13.68)
Citronellyl acetate (13.72)	Citronellyl acetate (6.4)	Citronellyl acetate (13.74)
Octanoic acid, 2-phenylethyl ester (12.74)	Octanoic acid, 2-phenylethyl ester (12.75)	Octanoic acid, 2-phenylethyl ester (12.78)
Neryl acetate (14.02)	Neryl acetate (13.92)	Neryl acetate (13.93)
Benzene ethanol (2.30)	Benzene ethanol (2.35)	Benzene ethanol (2.49)
Linalool (2.15)	Linalool (2.15)	
Citronellyl formate (2.95)	Citronellyl formate (2.97)	
Isosesamin (15.38)	Isosesamin (15.38)	
a- tocopherol (14.98)	a- tocopherol (14.96)	
1,12-octadecandiol (9.88)	1,12-octadecandiol (9.99)	
	Cis-rose oxide (2.2)	
Decanal (10.6)		
	Nerol (3.16)	
Sesamin (15.4)		
	Geraniol formate (3.49)	
Clionasterol (15.88)		
	Alpha costol (4.4)	
Squalene (13.9)		
	Valencene (4.57)	
	Tridecanoic acid (8.81)	
	Gamma tocopherol (14.63)	
	Beta sitosterol (15.86)	
	Dimethyl acetylene dicarboxylate (12.85)	

**Fig. 9:** Total ion chromatogram of Exhibit-1B.**Fig. 10:** Total ion chromatogram of Exhibit-2.

victim; hence, it is evidently proven that masseur had maliciously touched the private parts of victim during massage.

Conclusion

Touch, an inevitable component of massage therapy can become counter therapeutic if it is employed by the perpetrators to fulfill their atrocious intentions. Hiding of sexual misconduct under guise of massage may be the tool for the perpetrator to attempt repeatedly such malicious crime. These types of sexual abuse need utmost attention by the public authorities. Besides our effort of sexual assault ascertainment even during massage therapy through probing the massage oil layer absorbed at the interface of the undergarments, especially on the inner portions corroborating assaulter's malign attempt will certainly create terror in their mind. This research outcome demonstrates the credible potential of ATR-FTIR and GC-MS techniques in establishing Locard's exchange by forensic identification, comparison and corroboration of the trace evidence in sexual assault cases.

Forensic Significance

Sexual abuse in massage parlor can have psychological, emotional and physical effects on the survivor. After the incident, the survivor may have depression, flashbacks, post traumatic stress disorder, sexually transmitted infections and dissociation. This research publication does have societal outreach as it makes the public at large aware about these unreported & hidden sexual crime committed by massage therapist under the guise of massage in massage parlors and delineate an urgency to apprehend these massage therapist; suffering from the traits of psychoticism.

Through this paper a message will also be conveyed to massage therapists and owner of massage parlors that they must be conscious of all the boundaries from ethical standards to the regulatory laws with the customer during massage. Their wrongful act in the guise of massage can be proved scientifically and can put them behind the bar. The massage parlor owners must also take a note that improper touching from a massage therapist is one such inappropriate behavior that can lead to lawsuits, loss of license & reputation and financial hardship for the massage parlor.

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